

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV.—January, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JANUARY 2d, 1889.—The Society met at 20 o'clock, Vice-President J. James R. Croes in the Chair ; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: Winthrop Bartlett, St. Louis, Mo. ; Charles Addison Ferry, New Haven, Conn. ; John Leland FitzGerald, Greenbush, N. Y. ; Charles Wingate Gibbs, Silverton, Colo. ; Edward Adino Handy, Cleveland, O. ; George Alexander Keefer, Victoria, B. C. ; James Warren Pearl, Canton, O. ; John Charles Quintus, Erie, Pa. ; Lewis Frederick Rice, Boston, Mass. ; William Benson Storey, Jr., Carbonado, Wash. ; William Henry Wentworth, Monterey, Mex. As Associate : John Elfreth Watkins, Washington, D. C. As Juniors, Ysidori Ygnacio Polledo, Cardenas, Cuba ; Charles St. John Warner, New York City.

The Secretary announced the death on December 14th, 1888, of Mr. David A. Stewart, F. Am. Soc. C.E.

Written discussion on the paper by Past President James B. Francis, on "High Walls or Dams to Resist the Pressure of Water," by Messrs. E. Sherman Gould, E. A. Fuertes, and J. B. Francis, were read, and the subject was discussed by Messrs. Collingwood, Wellington, Flagg, J. P. Davis, Croes, Whistler, Buck, Fteley and Emery.

THE ANNUAL MEETING, JANUARY 16TH, 1889.

The meeting was called to order by President Thomas C. Keefer, who requested the Past Presidents present to take seats upon the platform. (Past Presidents McAlpine, Adams, Greene, Fink, Whittemore, Graff, Flad and Worthen were present during the meeting.)

On the nomination of members present, Messrs. Thomas Rodd, Frank C. Doran, Palmer C. Ricketts and Henry Manley were appointed Tellers to canvass the ballots for officers of the Society. On motion the polls were ordered to be closed at half-past eleven. The tellers were, on motion, authorized to proceed immediately with the preliminary work necessary before opening the ballots, but it was directed that no ballots be opened till half-past eleven.

The Annual Report of the Board of Direction was read by the Secretary, and on motion the report was accepted.

The Report of the Treasurer was read, and on motion accepted.

The hour of half-past eleven having arrived, the President declared the polls closed.

Mr. William G. Hamilton, M. Am. Soc. C.E., of committee in charge of subscriptions for proposed enlarged new building, stated that two of the members of that committee had been absent in Europe during last year; that the subscriptions to the fund amounted to \$9 219.50, and that as some time might elapse before the large sum requisite for a suitable new building would be secured, the Board of Direction had determined to build immediately an extension in the rear of the present house. This extension would be of one story and basement, would provide much better accommodation for the library and for the meetings, and would add to the selling value of the present property when the new building should be erected. The efforts to secure a sum sufficient for a proper permanent building would be continued.

On motion the report was accepted and the committee continued.

The PRESIDENT.—The Secretary will now present a statement in regard to a proposed visit of members of the Society to Europe.

The SECRETARY.—I am instructed by the Board of Direction to state that the suggestion of a visit by members of the Society to Europe during the year 1889 had been informally considered, and that during the fall several letters had been received in regard to such a visit from gentlemen abroad. At the meeting of the Society, held December 5th, 1888, a formal letter was presented from the Institution of Civil Engineers at London. This letter was at that meeting referred to the Board of Direction with the request that all members of the Society be made acquainted with it, and with the action taken by other organizations. The Board thereupon issued the following circular :

AMERICAN SOCIETY OF CIVIL ENGINEERS,
127 East Twenty-Third Street, New York.

CIRCULAR OF INQUIRY AS TO A SUGGESTED VISIT TO EUROPE.

The Board of Direction informs the members of the Society that the following communication has just been received from the Institution of Civil Engineers.

THE INSTITUTION OF CIVIL ENGINEERS,
25 Great George Street, Westminster, S. W.
November 23d, 1888.

To the Secretary of

THE AMERICAN SOCIETY OF CIVIL ENGINEERS,
127 East Twenty-Third Street, N. Y., U. S.

SIR :

It is reported that many Engineers from the United States will probably visit Europe during the International Exhibition which is to be held in Paris in 1889.

In view of this, the Council of the Institution of Civil Engineers, at the first meeting of the present session, directed an inquiry to be addressed to you to ask : 1st. Whether this report is correct, and, if so, whether your Society can give any idea of the number of your members likely to come. 2d. Whether they will travel by way of England ; and 3d. What may be expected to be the approximate date of their arrival and the duration of their stay in this country.

The object of this inquiry is to enable the Council to consider the possibility of making such arrangements as may best tend to further the objects which the visitors have in view, and to render their visit generally as useful and agreeable as possible.

The Council need hardly assure you of its good will towards its professional brethren in the United States, and of its desire to embrace this opportunity of manifesting its friendly feeling to the utmost of its power.

Of course, in any case, the facilities afforded by this Institution are always at the disposal of your members.

We are, yours faithfully,

GEORGE B. BRUCE, *President.*
WILLIAM POLE, *Hon. Secretary.*
JAMES FORREST, *Secretary.*

This circular is now issued so that a proper reply may be made to the above letter.

For the information of members the following additional facts are given : An invitation has been extended to the American Society of

Mechanical Engineers, by the Institution of Mechanical Engineers of London. We are informed that it is expected that other foreign engineering or scientific societies will also arrange for special courtesies, and that in all these the members of this Society will be included. The American Institute of Mining Engineers and the American Society of Mechanical Engineers are taking steps to ascertain the probable number of their members who would visit Europe next spring in case special arrangements are made.

The following information has been secured by a Committee of the American Society of Mechanical Engineers as to practicable arrangements, and these or substantially similar arrangements can be made for the members of the American Society of Civil Engineers and their families.

DATES.—Minimum absence five weeks. From, say, last week in May to first week in July.

COST.—Round trip passage by steamer about \$110, going altogether in a body and returning individually at any time during the year, as may be convenient. Cost per day in Europe from \$4 upwards.

To determine : first, what reply to make to the communication of The Institution of Civil Engineers, and second, what arrangement, if any, should be made as to securing passage, rates, etc., a speedy reply to this circular is necessary. A postal card is inclosed for this purpose, which please fill up and return. The replies will be canvassed at the monthly meeting of the Board of Direction, and should therefore be at the Society House by January 2d, 1889.

Respectfully,

JOHN BOGART,

Secretary Am. Soc. C. E.

With the above circular a postal card was sent with alternative replies as follows :

- I. It will be impossible for me to visit Europe next spring with other members of the Society.
- II. I cannot say at present whether I would visit Europe with other members next spring, but I will know by ———, 1889, and will then inform the Secretary.
- III. Should a number of members decide to visit Europe next spring, I fully intend to go with them, and desire to be informed of any arrangements that may be made. My party would consist of myself and ———.

A very large number of replies to the circular have been received; quite a number say they may possibly go. Over one hundred state that

they fully intend to go, and desire to be informed of any arrangements that may be made.

A communication has since been received from the Society of Arts as follows :

SOCIETY OF ARTS, JOHN STREET, ADELPHI,
LONDON, W. C., 8th December, 1888.

To the Secretary

THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

SIR,—The Council of this Society have been given to understand that a visit of American Engineers to this country during the spring or summer of next year is in contemplation. The Council will be very glad if the Society of Arts can in any way facilitate the visit of your members to England, or render their stay here more pleasant. They will be glad to place the rooms of the Society at their disposal, and if their visit should coincide with the date of the Society's Annual Conversazione in June, they will be very pleased to see as guests on that occasion such of your members as may be able to attend.

We have the honour to be,

Sir, your obedient servants,

ABERCORN,

Chairman of Council.

H. TRUEMAN WOOD,

Secretary.

The Board of Direction presents this information with the suggestion that, as the Society has issued this circular with this result, it may be well to authorize the appointment of a committee to take charge of arrangements for members who desire to go ; not with the idea that this is to be a trip of the Society, but that desirable arrangements as to steamer accommodations, etc., may be secured for this large number of our members.

Mr. WILLIAM P. SHINN moved that the President be authorized to appoint a committee of three with regard to this proposed European trip. The motion was seconded.

Captain O. E. MICHAELIS.—I would like to say a word in regard to these invitations that have been read. The invitations, I think, show that it is not an invitation to the American Society of Civil Engineers as a body ; they are a very pretty and a very courteous inquiry as to the number of members who may visit Europe ; they do not extend an invitation to us. I do not see that the communication requires any action of this Society as a body.

Mr. A. M. WELLINGTON.—I so far sympathize with the point raised by Mr. Michaelis. Unless the Society intends to go abroad as a body, I do not see why the appointment of a committee should take place; it stamps an official character upon the visit of the Society which hereafter might lead to some embarrassing friction. Unless it is intended that the Society as a body should hold a convention or hold a special meeting abroad, but simply because these members go abroad unofficially, that a committee should be appointed by the President, seems hardly to be the thing.

The PRESIDENT.—I understand Captain Michaelis' remarks in the nature of an amendment to Mr. Shinn's motion.

Captain MICHAELIS.—No, sir.

Mr. WILLIAM P. SHINN.—Mr. President, I think my friend, Captain Michaelis, has struck rather an unfortunate entanglement in this matter. If I understand this case, the officers of the Institution of Civil Engineers have formally issued an invitation to the members of this Society, or at least they have asked the officers of this Society, to acquaint them with the intention of the members of this Society, as such, in regard to going to Europe during the International Exhibition of 1889. The Board of Direction of this Society has issued a circular stating that this opportunity occurs; that they may go over there and be received as members of this Society by the Institution of Civil Engineers, and every provision be made for their comfort and convenience. I see nothing wrong, nothing committing the Society to anything more than the return of the courtesy which is extended to us by the Institution. If we should appoint a committee to attend to this matter for such of the members as choose to go, it does not make it an official visit of the Society, but the members of the Society are invited to signify their intentions as such; they are offered the prospect of certain facilities, as such, and it seems to me there is nothing wrong in this Society's appointing a committee to facilitate this matter.

The PRESIDENT.—Perhaps it would bring out the sense of the meeting if Mr. Shinn's motion is put. I understand Captain Michaelis does not wish his expression of opinion to be understood as an amendment to that motion. As I understand, it is moved and seconded, that the question of the invitation of the Institution of Civil Engineers be referred to a committee of three, to be appointed by the President.

The motion was put and carried.

The PRESIDENT.—The Secretary will now read the statement of suggestions made by members as to a place for the next Annual Convention.

The Secretary read the statement as follows :

The following suggestions have been made as to place for holding the next Annual Convention :

Boston	suggested by	17
New York	"	12
San Francisco	"	11
Pittsburgh	"	9
Washington	"	9
London	"	9
White Sulphur Springs	"	8
Chicago	"	7
Cincinnati	"	7
Paris	"	6
Philadelphia	"	5
Burlington, Vt.,	"	5
Birmingham, Ala.,	"	5
Kansas City	"	5
Old Point Comfort	"	5
St. Louis	"	5
Saratoga	"	3
Virginia Mountains	"	3
Richmond	"	3
Mexico	"	3
Buffalo	"	3
Omaha	"	2
Newport	"	2
Newport News	"	2
Deer Park	"	2
Lake George	"	2
Helena, Mont.,	"	2
Charleston, S. C.,	"	2

Each of the following places have also been suggested by one member :

Lookout Mountain, Atlantic City, Block Island, Montreal, Chattanooga, St. Paul, Atlanta, Thousand Islands, Providence, Yosemite Valley, Fort William Henry Hotel, Caldwell, N.Y. ; Anniston, Louisville, Chautauqua, Moosehead Lake, Toronto, Lake Nicaragua, Roanoke, Detroit, New Orleans, San Diego, Cal. ; Nashville, Sault Ste. Marie, Narragansett Pier, The Saguenay, Troy, Wilmington, Del. ; Isle of Shoals, on an ocean steamer.

The following suggestion has been received from a number of Michigan members of the Society :

It has been suggested that the Michigan members of the American Society of Civil Engineers propose to that Society for their Annual Convention of 1889, that a boat be chartered to start from Buffalo,

taking members at Buffalo, Cleveland and Detroit, and visiting Mackinaw, Sault Ste. Marie Ship Canal and Bridge, the pictured rocks of Lake Superior, Marquette, Duluth, and the iron, copper and silver mines of northern Michigan, as they may arrange, holding their meetings on board the boat, this being one of the finest trips in summer that can be found—cool, pleasant, and devoid of dust. A very pretty souvenir of views along the route can be gotten up.

The following invitation was also presented :

NORTH ALABAMA IMPROVEMENT COMPANY,
HUNTSVILLE, ALA., January 11th, 1889.

Mr. JOHN BOGART,
Secretary Am. Soc. C. E.
127 East 23d Street, New York.

DEAR SIR,—At the suggestion of Mr. Hunter McDonald, M. Am. Soc. C. E., of Nashville, we write to extend to your Association a cordial invitation to hold your next Annual Convention in this city, and would be pleased to have you take the matter under favorable consideration. We have, doubtless, the most beautiful and lovely city in the South, with a large and elegant hotel in the city, and a magnificent summer resort hotel near the city, on Monte Sano, open from June to October. We can give you, therefore, ample and first-class accommodations.

Yours truly,

S. H. BUCK,
V. P. & G. M., N. A. I. Co.
ED. T. MASTIN,
Mayor, Huntsville.

Mr. FREDERIC C. WEIR presented a letter describing the hotel at Monte Sano, referred to above, as well adapted for a convention of the Society.

Mr. MENDES COHEN.—There seems to be no very decided information as to any particular point for holding the Convention next year. It occurs to me, if so large a number of our members think of going abroad as has been mentioned—about a hundred announce that they will go, and fifty others think they may—if so large a number are going abroad this year, there will be but a very small attendance at the Convention unless that Convention be held in the immediate vicinity of New York City, and immediately before, perhaps, the departure of the party who are going to Europe. I would therefore suggest that the best thing would be to hold the Annual Convention at some point along the Atlantic coast, say from Long Branch along down to Sea Girt, or some one of the points along the coast where there are comfortable hotels which would be sufficiently large to accommodate all who would attend the Convention. There is a point where the Pennsylvania Railroad,

coming down from Philadelphia, first strikes the coast—Spring Lake, I think—where there is a very large and fine hotel, and it may be as good as any other point. I merely throw that out as a suggestion to get the views of the members.

The PRESIDENT.—Has any other member any suggestion.

Captain MICHAELIS.—The vicissitudes of the service make me, from time to time, a resident of different portions of the country. Just at the present time I am an advocate of those who reside in our easternmost limits, and I want to take your time for a few moments to present to you the attractions that the State of Maine affords for a convention.

In the first place, we have not a single object of engineering interest to show you; secondly, we can supply you with an abundance of the clearest, purest, best water in the world; thirdly, at Mt. Desert we can offer you cerulean skies, pellucid waters and balmy air that will recall Italy and Como. The hotel accommodation is abundant, and if the time of the Convention be fixed for the latter part of June or early in July, all those hotels are vacant and very moderate terms can be made. The railroads in the State of Maine are one corporation, and I can say it is a very liberal corporation; I think they are always inclined to make very low rates for every convention that is held in that State. One rate, I believe, covers going and returning. I think it would be very easy to arrange an excursion including Moosehead Lake, Mt. Desert and the White Mountains. I believe the Canadian Pacific is now in position to deliver its passengers in Maine. Perhaps our President knows more about that than I do, and therefore it would afford facilities for our Canadian members to join us. For the members south of New York, the New York and New England offers every facility. We should be undisturbed there by anything to distract our attention, and the pleasures that such a trip affords, I think I need not dwell upon. We have the most beautiful country walks, which are an attraction to the young members and not unattractive to the older ones, who will revive their youth.

Mr. M. M. TIDD.—I would like to second the remarks of Captain Michaelis. I was one of the seventeen members who voted to hold the convention in Boston, and in doing so I had in view this very thing that Captain Michaelis has suggested. I have not seen anywhere abroad scenery surpassing that to be found in this locality, and I assure you you will receive as cordial a welcome there as in any part of the country.

Mr. HORACE CROSBY.—As a native of the State of Maine, I can endorse fully what the two preceding speakers have said. Although not now a resident of that State, I occasionally visit it and I can assure you a very pleasant welcome. It is true the points of engineering interest are few and far between, but perhaps it would be well to have a little change in that regard for the Conventions.

The PRESIDENT.—In connection with the remarks of Captain Michaelis, I ought to say that there is within reach of an excursion

from Maine, or Mt. Desert, an interesting work in progress, the first of its kind, the Chignecto Marine Railway. They only commenced operations late in the autumn. The engineers from England sent out by the Company only reached New York in October last, but I have had a letter from the local engineer, Mr. Ketcham, in which he stated that there are four hundred men at work, and a steam excavator at each end. I hope to say by the time of the Convention that the work will have made sufficient progress to make it worthy of a visit.

Captain MICHAELIS.—I forgot one important point in my remarks. Some years ago, when the Mining Engineers held their convention at Halifax, the railroad administration of the Dominion gave a pass to every member who attended, over their lines of road. You all must know that the Interstate Commerce Act does not apply to the Dominion.

The PRESIDENT.—I think I can speak for the railways of Canada, and if any excursions are projected into Canada, the railways will offer every facility in their power.

Mr. J. J. R. CROES.—I think Captain Michaelis stated that there are very few members of the Society in that region of the country. I would like to know whether there are many engineers there.

Captain MICHAELIS.—I never met one.

Mr. CROES.—The argument that I was going to advance, then, would not hold good. It was that these Conventions have very largely proved to be missionary enterprises in regard to gaining members for the Society. Whenever a Convention has been held in a new district, there has been a large accession to the Society from that district; they have found out that the Society is worth something and they have joined to a great extent. If we were anywhere near, and these excursions could be made to the points at which there were engineers, it might be worth while.

Captain MICHAELIS.—There are, I believe, a number of engineers in New Brunswick; and while I would not promise an immediate accession to the Society, such an excursion might prove of future benefit.

Mr. TIDD.—I had in my mind pretty much the whole of New England; I might say, New Hampshire, Maine and New Brunswick; there are many engineers there, and we have some members there; I have no doubt they would do everything in their power to facilitate our trip.

Mr. W. BARCLAY PARSONS.—I think it would be well to stay in the vicinity of New York as suggested, but if we are to go away from New York, it seems to me that it would be desirable to turn our faces towards the South; and in connection with Mr. Croes' remarks, I believe the Society is not strong in the South, where there are a large number of engineers; if we are to go away from New York City it would be well to consider the places in the South.

The PRESIDENT.—Has any gentleman any other place to bring before

the meeting, or anything to suggest in connection with those already advocated?

Mr. J. P. DAVIS.—I do not think we ought to decide this question at this time. I would move that this matter be referred to a committee of five, to be appointed by the chair, to decide the time and place.

Mr. D. J. WHITTEMORE.—I wish to make an amendment to the motion, and that is that instead of a committee of five, it be referred to the incoming Board of Direction.

Mr. DAVIS.—I accept that amendment.

The PRESIDENT.—It is moved and seconded that the selection of the time and place for the next Convention be referred to the incoming Board of Direction.

This motion was put and carried.

Mr. SANDFORD FLEMING then presented and read the report of the Committee on Uniform Standard Time (printed at a subsequent page of these proceedings).

On motion, the report was accepted, ordered printed and the committee continued.

Mr. FLEMING.—The committee most unfortunately lost by death one of its members some time back, and if the committee is to continue it will be well to have his place filled up. I move that Mr. Frederick Brooks be added to the committee.

This motion was seconded and carried.

Mr. FLEMING.—If the committee is to continue we must do something, and if the Society thinks that we should do it, we, I think, ought to be authorized to go further. I submit, therefore, the following resolution:

That further efforts be made to effect the general adoption of the twenty-four-hour notation by the railways of the country, and with this view, the committee is requested to seek the co-operation of the General Time Convention.

This resolution was seconded and carried.

Mr. D. J. WHITTEMORE.—To keep this matter before the public, I suggest whether we consider the propriety of asking our General Government to regulate its time according to the plan of the committee; whether it is advisable to have a petition of members of the Society that that system be adopted by our General Government.

The PRESIDENT.—Has any gentleman anything to say upon Mr. Whittemore's suggestion; does any one wish to speak on the point with reference to calling the attention of the General Government of the United States to standard time?

Mr. COHEN.—I do not like that proposition at all. If the General Government, or rather Congress, will attend to the matters within their province, we will attend to ours; we will take care of the time questions. The managers of the railways will do that themselves, but to go to Con-

gress with a thing of this sort only interferes with the general business which they don't attend to there, and no good will be accomplished. We can attend to that in time.

Mr. WHITEMORE.—I hardly think the Government will pay much attention to it, but I thought that in this way we could keep it before the public and make them think of it; I think it might do good.

Mr. FLEMING.—I may mention that Mr. Toucey, the General Superintendent of the New York Central and Hudson River Railroad, a member of the committee, holds very strong views; he thinks well of the system.

A great many members in different parts of the country suggest that there should be some way in which this question should be brought before the public schools. I don't know the best way; the method I suggested at the last Convention did not meet with much favor. I hope that there may be some other more practical way in which this can be done. I merely throw out a suggestion, that the committee be authorized to take such steps as may seem to them advisable to bring the subject before the public schools of the country.

The PRESIDENT.—Has any gentleman any remarks to make on that proposition?

Mr. COHEN.—Mr. President, before taking a vote upon that, it seems to me that in this project of bringing the matter before the public schools, the issue of the necessary circulars, etc., will be attended with a vast amount of expense; and whilst it may be desirable to keep up the education, yet whether it is so desirable that these results be accomplished so rapidly as to involve the Society in a great deal of expense, I think is doubtful. We have a vast amount of printing and publication now, and it costs a great deal of money; I think our postage bill, for instance, is more than a thousand dollars. If we are going to communicate with the schools, it would involve a great deal of expense, and while I do not desire to limit the action of the committee, yet I simply want to remind the Society that it may mean a matter of very great cost.

Mr. C. SOOYSMITH.—Another consideration occurs to me. From the letters read by Mr. Fleming it seems evident that the railways are marching in the right direction, and I should say from the experience in standard time, whenever they lead, the public will gradually follow. Will it not be better to let the railroads lead in the matter, as we seem to be sure of their support?

Mr. F. COLLINGWOOD.—We have now a report of the committee which shows absolute progress and a successful use of this method on a great length of railroad. Why not let the committee send such of these documents, or such portions of them as are printed, showing the progress of the movement to the people we wish to influence, and let that be the extent of the movement, a movement which could be accom-

plished without very great cost, because we will have the matter in type.

Mr. F. W. SKINNER.—It might be well to send them to some of the technical schools; that would be a good place to draw the line; they would do more good there probably than in the ordinary educational schools.

Mr. CROES.—I move to substitute the word "technical" for "public."

The motion was seconded.

Mr. J. P. DAVIS.—I would make a suggestion that this be referred to the Board of Direction, with power; they can limit the expense. I do not think the committee should have power to act at the expense of the Society. I merely make that suggestion.

Mr. FLEMING.—I do not think, sir, the committee has caused the Society much expense so far.

The PRESIDENT.—Mr. Croes moves to amend the resolution offered by the committee by striking out the word "public" and inserting the word "technical," so that the resolution would read: "That the committee be authorized to take such steps as may seem to them advisable to bring the subject of Time Reform to the attention of the technical schools of the country."

The PRESIDENT then put the amendment, and it was carried.

Mr. FLEMING.—I was going to suggest adding two or three words to prevent the possibility of the committee incurring any unnecessary expense; that they should act subject to the approval of the Board of Direction. With the consent of the meeting, these words might be put in.

The PRESIDENT.—Mr. Fleming suggests an amendment as follows: That the committee be authorized to take such steps as may be approved by the Board of Direction of the Society to bring the subject of Time Reform to the attention of the technical schools of the country.

Mr. FLEMING.—If the addition of these words be approved by the meeting, perhaps they would also approve of omitting the word "technical." It would, I think, be better, and if the action of the committee is controlled entirely by the Board of Direction, they would see that nothing improper is done by the committee.

Mr. COHEN.—I should think that suggestion might well be accepted. Of course, it was not because we supposed that anything out of the way would be done by the committee; it was rather a matter of principle that was involved than any anticipation that there would be undesirable action by the committee.

The PRESIDENT.—It would be necessary to reconsider the whole question. The amendment has been carried as to technical schools.

A motion to reconsider was made, seconded and carried.

Mr. FLEMING then presented the proposed resolution as follows:

That the committee be authorized and requested to take such steps as may be approved by the Board of Direction of the Society to bring the subject of Time Reform to the attention of the schools of the country.

This motion was seconded and carried.

The PRESIDENT.—The next business in order is the report of the Committee on the Compression of Cements and the Settlement of Masonry.

Mr. F. COLLINGWOOD, Chairman of Committee.—I suppose all the members have received our last report. The committee have nothing more at present to offer. The committee is composed of members who are exceedingly busy men, and those who have access to testing-machines have not been able to do any work. I have quite recently been offered help from Professor Ira O. Baker, who is not a member of the committee, and hope, if the committee is continued, to be able to give some valuable results. We want some one who can take up the work, and make a series of tests which shall be sufficiently exact and sufficiently well considered to give results which shall be thoroughly comparative. The results so far have not been compared satisfactorily. I am sorry to say that we have at present no work going on. If the committee is continued I will do what I can, and if any member is making any experiments, or has any knowledge of any, under pressures running up to a breaking strength of, say, 4 000 pounds, I would like to be put in communication with him.

The committee was, on motion, continued.

The Board of Censors to award the Norman Medal presented the following report:

The Board of Censors to award the Norman Medal for the year terminating August 1, 1888, report that, in their judgment, the award should be made to Paper No. 388, "English Railroad Track," by E. E. Russell Tratman, Jun. Am. Soc. C. E.

Respectfully submitted,

FRED. GRAFF,
THEODORE COOPER,
E. N. K. TALCOTT,
Board of Censors.

January 16, 1889.

The Committee to award the Rowland Prize made the following report:

The Committee appointed to award the Rowland Prize for the year terminating August 1, 1888, report that, in their judgment, the prize should be awarded to paper No. 371, "The Venturi Water Meter; An Instrument making use of a New Method of Gauging Water, applicable to the cases of very large Tubes, and of a small Value only, of the Liquid to be Gauged," by Clemens Herschel, M. Am. Soc. C. E.

Respectfully submitted,

B. M. HARROD,
F. H. HAMBLETON,
JOHN BOGART,
Committee.

January 16, 1889.

After announcement of the proposed excursion for the next day, the Society, at 13 o'clock, took a recess till 14.30 o'clock.

Lunch was served in the Society House.

AFTERNOON SESSION.

President THOMAS C. KEEFER in the chair.

The PRESIDENT.—The next business in order is the report of the Committee to Consider the Proper Relation to Each Other of the Sections of Railway Wheels and Rails.

Mr. H. STANLEY GOODWIN, Chairman of Committee.—Mr. President, the committee are not prepared at this time to do anything more than report progress. They are not ready to make a report supplementary to, or in addition to the report presented at the Convention at Milwaukee. They have in their hands a considerable amount of information which they are endeavoring to adjust and collate as fast as their time will permit. They desire simply to report progress at this time, and say, if it shall be the pleasure of the Society to continue the committee, they will have a report to present at the coming Convention. They are in continued receipt of matter which is pertinent to the subject, and the more attention which the committee give it, the more they are convinced of the importance of the subject and the vast field which it covers, as also the difference of opinion which prevails among practical and skillful men who have given attention to the subject.

I would say that Mr. Wellington, the Secretary of the committee, has been most enthusiastic in his labors. I think the printed report will show that a great deal of information has been brought out and this work still continues.

The PRESIDENT.—The question of the report of the committee which has been alluded to is now open for discussion.

Mr. D. J. WHITEMORE.—Mr. President, I have prepared a paper, extracts from which I propose to read, which relates particularly to this subject.

Mr. Whittemore then read extracts from the paper referred to.

The PRESIDENT.—The subject of the report of the committee and the paper of Mr. Whittemore is now open for discussion. I am informed, however, that the tellers to canvass the ballot for officers are now ready to report. The discussion will therefore be interrupted while the report is presented.

The tellers then presented their report as follows:

The tellers to count the votes for officers at the Annual Meeting, beg to report as follows:	
Total number of ballots received are.....	596
This does not include votes of members whose dues are not paid.....	16
Nor votes without signatures.....	12
	— 28

The following is the vote:

For *President*: M. J. Becker, 311; T. C. Clarke, 282; A. M. Wellington, 1; Mendes Cohen, 1.

For *Vice-President*, Alphonse Fteley, 592; E. L. Corthell, 577; J. J. R. Croes, 6; C. B. Comstock, 3; J. M. Wilson, 2; Alfred Noble, 2; Mendes Cohen, 1; L. L. Buck, 1; Charles Hermany, 1; W. E. Merrill, 1; Charles Ackenheil, 1.

For *Secretary and Librarian*, John Bogart, 584; C. B. Brush, 3; A. M. Wellington, 2; Fred. Brooks, 1; T. C. Clarke, 1; E. P. North, 1.

For *Treasurer*, George S. Greene, Jr., 592; F. Collingwood, 2; E. B. Van Winkle, 1; W. H. Wiley, 1.

For *Directors*: Walter Katté, 575; William P. Shinn, 574; E. C. Clarke, 572; Robert E. McMath, 572; C. B. Brush, 570; Joseph P. Davis, 8; H. D. Whitcomb, 3; G. H. Benzenberg, 3; S. Towle, 2; L. L. Buck, 2; William P. Craighill, 1; J. C. Post, 1; P. F. Brendlinger, 1; E. Low, 1; J. M. Wilson, 1; Adna Anderson, 1; C. Breckenridge, 1; Mendes Cohen, 1; M. S. Belknap, 1; A. M. Wellington, 1; T. Cooper, 1; William Metcalf, 1; Robert Moore, 1; C. Hermany, 1; D. McN. Stauffer, 1; E. B. VanWinkle, 1.

Respectfully submitted,

F. C. DORAN,
THOMAS RODD,
PALMER C. RICKETTS,
HENRY MANLEY.

Tellers.

The PRESIDENT then announced that the following named members had been duly elected officers of the Society for the ensuing year:

President, M. J. BECKER.

Vice-Presidents, A. FTELEY, E. L. CORTHELL.

Secretary and Librarian, JOHN BOGART.

Treasurer, GEORGE S. GREENE, JR.

Directors, CHARLES B. BRUSH, ELIOT C. CLARKE, WALTER KATTÉ, ROBERT E. MCMATH, WILLIAM P. SHINN.

The President-elect was presented by the President to the Society.

The report of the Committee on the Relation of Sections of Railway Wheels and Rails was discussed by Messrs. William P. Shinn. A. M. Wellington, O. E. Michaelis, Jacob M. Clark, Clark Fisher and D. J. Whittemore.

The report of progress of the Committee on the Proper Relation to Each Other of the Sections of Railway Wheels and Rails was, on motion, accepted, and the committee continued.

The Annual Meeting then adjourned.

On Thursday, January 17th, the members in attendance at the Annual Meeting met at the Society House and proceeded by elevated railway to One Hundred and Twenty-fifth street, and then by cable road to the gate house of the New Croton Aqueduct, and escorted by Mr. A. Fteley, M. Am. Soc. C. E., inspected that structure and also the laying of the large iron water mains connecting the New Aqueduct with the city distributing reservoirs. A number of the party visited the newly-completed Harlem River Bridge (two steel arches each of 510 feet span and seven granite arches of 60 feet span each). The party then proceeded by steamer to the yards of the Department of Docks, where, under escort of George S. Greene, Jr., M. Am. Soc. C. E., the fabrication of concrete blocks of 70 tons weight was examined. The operation of setting these blocks under water, by the great floating derrick of the Department of Docks, was also exhibited. Lunch was then served on the steamer. The Brooklyn terminus of the New York and Brooklyn Suspension Bridge was then visited, and under escort of C. C. Martin, M. Am. Soc. C. E., the new cable driving machinery inspected. The steamboat then landed at the foot of East Fifteenth street, New York, and an inspection was made of the steel water tank and triple section telescopic gas holder of the Consolidated Gas Company. This steel tank is the largest metallic reservoir in the world, and the gas holder is the largest gas receptacle in America. They were designed by Mr. Thomas F. Rowland, M. Am. Soc. C. E.

In the evening a reception for gentlemen was held at the Society House.

The members of the Society, of the various classes, 176 in number, present at the annual meeting, excursion, etc., were: Charles Ackenheil, Julius W. Adams, P. C. Asserson, John W. Bacon, Frederick H. Baldwin, William J. Baldwin, Carrol Ph. Bassett, Leonard F. Beckwith, Arthur Beardsley, M. J. Becker, Henry A. Bentley, John A. Bense, George H. Benzenberg, George H. Bishop, H. Bissell, John Bogart, Alfred P. Boller, Charles P. Bonnett, William F. Booth, W. A. Brackenridge, P. F. Brendlinger, Josiah A. Briggs, A. G. Brinckerhoff, H. Waller Brinckerhoff, Charles B. Brush, Andrew Bryson, L. L. Buck, William H. Burr, Frank A. Calkins, David S. Carrl, Jacob M. Clark, H. Wadsworth Clarke, Edward B. Codwise, Mendes Cohen, F. Collingwood, Theodore Cooper, Henry S. Craven, J. James R. Croes, Horace Crosby, J. Foster Crowell, Charles Davis, Joseph P. Davis, Alexander Dempster, George Devin, S. L. F. Deyo, Frank C. Doran, Stancliff B. Downes, Thomas Egleston, Charles E. Emery, John W. Ferguson, Albert Fink, Clark Fisher, J. Foster Flagg, Sandford Fleming, John D. Fouquet, A. Fteley, George S. Gatchell, William Gibson, Jr., Henry H. Gladding, H. Stanley Goodwin, E. Sherman Gould, Frederick Graff, Charles H. Graham, Samuel M. Gray, William Gray, David M. Greene, George S. Greene, George S.

Greene, Jr., Edward B. Guthrie, William G. Hamilton, Charles M. Harris, Robert L. Harris, William J. Haskins, G. F. Haynes, Warren E. Hill, S. Willett Hoag, Jr., E. W. Howe, Rudolph Hering, William M. Hughes, Alfred E. Hunt, Charles W. Hunt, Washington Jones, Walter Katté, Thomas C. Keefer, Cassius W. Kelly, Thomas P. Kinsley, Joseph M. Knap, William B. Knight, Edward J. Landor, E. D. Leavitt, Jr., G. Leverich, Horace Loomis, L. F. Loree, D. Jones Lucas, Charles Macdonald, William W. Maclay, Henry Manley, C. C. Martin, William J. McAlpine, David E. McComb, T. H. McKenzie, Mansfield Merri- man, William Metcalf, Henry C. Meyer, O. E. Michaelis, H. I. Miller, Henry G. Morse, Gouverneur Morris, S. Fisher Morris, Charles H. Nash, Charles E. Newham, Edward P. North, L. F. Olney, John F. O'Rourke, Joseph O. Osgood, John E. Ostrander, Frederick N. Owen, James Owen, William H. Paine, William Barclay Parsons, John A. Partridge, Edward F. Playle, Willard S. Pope, Andrew J. Post, George S. Rice, Palmer C. Ricketts, Percival Roberts, Jr., Thomas Rodd, R. P. Rothwell, Charles B. Rowland, Thomas F. Rowland, George M. Rusling, F. M. Rutherford, J. Gardner Sanderson, William L. Saunders, A. C. Savage, C. C. Schneider, William H. Searles, Ira A. Shaler, Robert A. Shailer, William P. Shinn, George S. Skilton, Frank W. Skinner, R. I. Sloan, Eugene R. Smith, Joseph S. Smith, Charles SooySmith, J. F. Sorzano, D. McN. Stauffer, W. A. Sweet, Edward B. Taylor, G. H. Thomson, M. M. Tidd, Calvin Tomkins, Stevenson Towle, E. E. Russell Tratman, L. L. Tribus, Alfred W. Trotter, John G. Van Horne, J. A. L. Waddell, C. C. Waite, J. H. Warder, James R. Wardlaw, R. Willard Ware, A. M. Wellington, Frederick C. Weir, E. B. Weston, Schuyler S. Wheeler, Frank O. Whitney, Thomas D. Whistler, Don J. Whittemore, William H. Wiley, William P. Williams, C. J. H. Woodbury, William E. Worthen, Henry W. York.

OF THE BOARD OF DIRECTION.

JANUARY 3D, 1889.—Applications considered. A Committee was appointed on Annual Meeting details. The committee appointed at the last meeting reported plans for an extension in the rear of the present house. The plans were approved and the erection of the extension ordered. Financial business was transacted.

JANUARY 15TH, 1889.—The Secretary presented draft of Annual Report. The draft was discussed, amended and the report adopted. The Secretary was directed to present at the Annual Meeting a statement as to the action taken in regard to a proposed visit of Members of the Society to Europe.

JANUARY 16TH, 1889.—In accordance with the provisions of the Constitution, the following Standing Committees were appointed. On Finance: Messrs. Brush, Katté and Clarke. On Library: Messrs. Fteley, Shinn and Corthell.

REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1888.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 18TH, 1889.

The Board of Direction, in compliance with the provisions of the Society law, presents its report for the year ending December 31st, 1888.

MEMBERSHIP.

As shown by the tabular statement, hereinafter given, there has been during the year an addition of 176 to the various grades of Society membership. In this nominal addition of 176 there are included 3 Members transferred to Honorary Membership and 17 Juniors transferred to Membership, therefore the actual new additions to the Society membership during the year 1888 number 156. The actual additions to the Society membership during the previous year, 1887, amounted to 91.

The losses from the Society membership have been 24, being 15 by death and 8 by resignation. The number of persons now connected with the Society is 1 243, being greater by 133 than at the end of the previous year.

The actual net increase during the year and the present total in each class of membership, are:

Honorary Members,	increase during year,	2	Total.....	10
Corresponding Members.....				3
Members,	increase during year,	106	"	944
Associates,	" " "	3	"	48
Juniors,	" " "	24	"	144
				<hr/>
				1 149
Fellows, not included above, decrease.....	2	"		54
Subscribers to the Building Fund, not included above		"		40
				<hr/>
Increase during year.....	133	"		1 243

Tables showing the classification of membership at the beginning of the year, and the changes during the year, are given at a subsequent part of this report.

ANNUAL CONVENTION.

The Annual Convention was held at Milwaukee, Wis, June 28th to July 4th, 1888.

The proceedings have been published in detail in the Proceedings of the Society for July of that year. There were 133 Members in attendance, with many members of their families. The Annual Address of the President was read and there were a number of interesting papers presented and discussed. Excursions were made to points of interest in Milwaukee and vicinity, and also to Appleton, Kaukana, Oconomowoc and Waukesha; and after the close of the Convention, a number of Members visited the mining regions of Wisconsin, Michigan, and the Sault Ste. Marie.

The suggestions made by Members as to a place for the next Convention will be presented at this meeting for your consideration.

MEETINGS OF THE SOCIETY.

Twenty-two meetings of the Society were held during the year, one of which was the Annual Meeting, held in New York, January 18th and 19th; and another, the Annual Convention, held at Milwaukee, Wis., June 28th to July 4th. All the sessions of the Convention, including the business meeting, being counted as one meeting of the Society.

Nineteen meetings of the Board of Direction have been held during the year.

Collations, provided entirely by subscriptions of the Resident Members, have followed all regular meetings of the Society at New York.

THE SOCIETY HOUSE AND BUILDING FUND.

A special committee of Members of the Society has in charge the ascertaining whether an amount can be obtained from among persons connected with engineering interests for the purpose of the erection of a large and suitable edifice for the future occupancy of the Society. In the meanwhile, as it is probable that some time will elapse before such a building can be erected, the Board of Direction has, under the authority specially given it, determined to erect an extension of the present house which will accommodate the meetings of the Society and the Library, temporarily.

THE NORMAN MEDAL.

The Norman Medal for the year 1887 was awarded to Paper No. 340, "Evaporation," by Desmond FitzGerald, M. Am. Soc. C. E.

The Board of Censors to award this medal for the past year will present its report at the present meeting.

THE ROWLAND PRIZE.

The Rowland Prize for the year 1887 was awarded to Paper No. 361, "Steel; its Properties, its Uses in Structures and in Heavy Guns," by William Metcalf, M. Am. Soc. C. E.

The committee to award this prize for the past year will present its report at the present meeting.

AMENDMENTS TO THE CONSTITUTION.

A number of amendments to the Constitution were submitted in due form, considered at the last Annual Meeting, and voted upon, the vote being canvassed at the meeting of March 7th, 1888.

Of these an amendment to Article XVIII was adopted, as follows:

"Proposals for admission to the Society of Engineers not resident in North America, and who may be so situated as not to be personally known to five members of the Society, may be endorsed for ballot by five members of the Board of Direction, who shall, for such purpose, secure evidence sufficient, in their opinion, to show that the candidate is worthy of acceptance."

Under this provision of the Constitution, members of the Board of Direction have, in a number of cases, endorsed for ballot certain engineers who were not personally known to a sufficient number of Members of the Society, and in regard to whom evidence was given that they were worthy of membership.

The following amendment to Article XIX of the Constitution was also adopted:

"The Board of Direction, upon receipt of letters from not less than eight members in good standing, requesting a re-consideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary shall mail to each member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned."

But one case has been presented to the Board under this provision of the Constitution, the open ballot upon which has been recently issued, to be canvassed at the next meeting of the Society.

The other proposed amendments to the Constitution are given in the Proceedings for January, 1888, and were not adopted.

No amendments have been offered for consideration at this meeting.

REPORT OF THE COMMITTEE AS TO GRADES AND TITLES OF ENGINEERS
ON PUBLIC WORKS.

At the last Annual Meeting the appointment of a committee was directed to formulate regulations with reference to grades and titles of engineers on public works. This committee was duly appointed and made its report at the Annual Convention, which report has been printed in the September Proceedings.

THE REPORT OF THE COMMITTEE TO CONSIDER THE PROPER RELATION TO EACH OTHER OF THE SECTIONS OF RAILWAY WHEELS AND RAILS.

This committee presented a report of progress at the Annual Meeting. Its preliminary report has since been submitted to the Society in the Transactions for July.

The committee will be called upon at this meeting for any further report they desire to make, and the subject will be one open for discussion

THE REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

The committee made reports at the Annual Meeting, and also at the Convention. An additional report will be expected at the present meeting.

THE COMMITTEE ON COMPRESSIVE STRENGTH OF CEMENTS AND THE COMPRESSION OF MORTARS AND SETTLEMENT OF MASONRY.

This committee has made reports at the Annual Meeting and also at the Convention, the latter report having been published in the Transactions for June of the past year.

THE TRANSACTIONS OF THE SOCIETY.

The publication of the Transactions has been continued regularly during the year. Communications addressed to the Board in reference to matters connected with the Transactions have been carefully considered, and the Board, in order that full information as to its previous action upon this subject might be given to all interested, issued the following circular:

AMERICAN SOCIETY OF CIVIL ENGINEERS,
127 East Twenty-third Street, New York.

The Board of Direction of the American Society of Civil Engineers invites professional papers and communications on subjects of engineering interest from all persons, whether members of this Society or not. These papers and communications will be accepted for publication in the Transactions of the Society, subject to the regular rules prescribed by the Society laws in regard to its publications. These rules provide for a proper editorial supervision, and for the exclusion of old matter readily found elsewhere, of matter specially intended to advocate personal interests, of matter carelessly prepared or controverting established facts, and of matter purely speculative or foreign to the purposes of the Society.

Discussion is also invited from all persons interested in the papers presented to the Society, such discussion to be, of course, subject to the same editorial rules.

The Transactions of the Society will be sent to any subscriber at the rate of \$10 per year; and to clubs of ten or more, when ordered through

the Secretary of an engineering or technical society or club, who will be responsible for the payment, at 25 per cent. discount.

For the Board of Direction.

JOHN BOGART,
Secretary.

In reference to the copyright upon Transactions, the Board has declined to make any modification of the past system. At present, anybody is permitted to make any proper use of the publications, and there has been no interference with, or objection to the reproduction of matter from the Transactions, provided it be in proper publications, and that due credit be given to the author and to the Transactions. The Board considers that it would be undesirable to eliminate the only means of correcting a misuse, if such should occur.

SUGGESTED VISIT OF MEMBERS OF THE SOCIETY TO EUROPE.

A communication from the Institution of Civil Engineers, London, was received in December last, in reference to a probable visit to Europe of Members of this Society during the International Exhibition to be held in Paris in 1889. This letter has been transmitted by circular to all the Society membership, together with some information as to arrangements that may be made if a suitable number of Members desire to make such a visit. Other engineering organizations are considering similar arrangements. Replies have been received from a large number of Members of this Society, and over one hundred have signified their expectation of making such a trip, if arrangements be perfected for that purpose.

MEMBERSHIP TABLES.

The following tables show the changes and additions during the year in the various classes of Membership.

On January 1st, 1887, the date of the last report, the membership in the Society was:

Honorary Members, resident....	3	Non-resident..	5	Total...	8
Corresponding Members.....	—	" ..	3	" ...	3
Members, resident.....	168	" ..	670	" 838	
Associates, "	11	" ..	34	" 45	
Juniors, "	29	" ..	91	" 120	
				—	1 003
Making, resident.....	211	Non-resident..	803		
Total.....					1 014
Fellows, 62, of whom 6 Members are included above, leaving....					56
Subscribers to the Building Fund, 140, of whom 89 are entered in one or other of the above classes, and 11 deceased, leaving....					40
Total connected with the Society, January 1st, 1888..					1 110

At the present date, January 1st, 1889, the membership is:

Honorary Members, resident...	7	Non-resident..	3	Total...	10
Corresponding Members	—	"	3	"	3
Members, resident.....	193	"	751	"	944
Associates, "	12	"	36	"	48
Juniors, "	40	"	104	"	144
				—	1 136
Making, resident.....	252	Non-resident..	897		—
Total.....					1 149
Fellows, 59, of whom 5 Members are included above, leaving.....					54
Subscribers to the Building Fund, 140, of whom 87 are entered in one or other of the above classes, and 13 deceased, leaving...					40
Total connected with the Society, January 1st, 1889..					1 243

The additions during the past year to the several classes of Society membership have been:

Honorary Members qualified.....	3
Members qualified..	124
Associates qualified.....	5
Juniors qualified	43
Fellow qualified	1
Total additions	176

The decrease during the year in the several classes of membership has been:

Honorary Members..Died 1.....	1
Members..... " 9 Resigned 6*. Transferred to H. M.3.	18
Associates..... " 2.....	2
JuniorsDied 1 " 1. Transf'ed to Member 17.	19
Fellows " 4	4
<hr/>	
Totals: Deaths 15, Resignations 9, Transferred 20	44
*1 Resigned membership but continues a Fellow	1
<hr/>	
	43

There has been an addition of 176 to the various classes of membership, and a decrease of 43, making the actual net additions during the year 133 in number.

On January 1st, 1888, there were, as stated in the last Annual Report, 56 proposals pending. Two hundred and fourteen proposals have been received during the year; 130 candidates have been elected Members, of whom 17 were transferred from Juniors; 6 candidates have been

elected as Associates; 44 candidates have been elected as Juniors; 1 candidate has been elected a Fellow; 3 Members were transferred to Honorary Members.

One hundred and twenty-four persons have during the year qualified as Members; 5 have qualified as Associates; 43 have qualified as Juniors; 1 has qualified as Fellow; 11 candidates elected during the year as Members, 1 as Associate and 4 as Juniors, have not yet qualified. There are 26 proposals now pending.

The Library has been increased during the year by the following additions:

Books and Pamphlets.....	609
Maps, Plans, Drawings, Charts, Photographs and	
Engravings.....	375

The Society has lost, by death, during the term covered by this report, one Honorary Member: SQUIRE WHIPPLE; nine Members: WILLIAM L. BAKER, SAMUEL B. CUSHING, CHARLES H. FISHER, QUINCY A. GILLMORE, CHARLES LATIMER, FREDERICK MERCUR, HENRY W. B. PHINNEY, JAMES L. RANDOLPH and HENRY F. WALLING; one Junior: WILLIAM A. G. EMONTS; and four Fellows: GEORGE AINSLIE, GEORGE W. CASS, SPRINGER HARBAUGH and DAVID A. STEWART. Messrs. Ainslie and Harbaugh died previous to this term; these deaths, however, were not announced until the present year.

Respectfully submitted,

JOHN BOGART, *Secretary*.

REPORT OF THE TREASURER FOR THE YEAR ENDING DECEMBER 31st, 1888.

RECEIPTS.

Balance on hand December 31st, 1887:

Building Fund.....	\$5 134 50
General Funds.....	1 371 02
	<hr/>
	\$6 505 52

Entrance Fees..... \$4 240 00

Current Dues:

From 142 Resident Members.....	\$3 440 00
" 636 Non-resident Members.....	9 247 00
" 13 Resident Associates.....	187 50
" 30 Non-resident Associates.....	300 00
" 23 Resident Juniors.....	307 50
" 100 Non-resident Juniors.....	970 00
	<hr/>
	\$14 452 00

Past Dues:

From 16 Resident Members.....	\$575 00
" 61 Non-resident Members.....	1 295 12
" 3 Resident Associates.....	45 00
" 7 Non-resident Associates.....	130 00
" 1 Resident Junior.....	15 00
" 8 Non-resident Juniors.....	110 15
	<hr/>
	2 170 27

Dues for year beginning January 1st, 1889:

From 32 Resident Members	\$800 00
" 123 Non-resident Members.....	1 830 19
" 3 Resident Associates.....	45 00
" 6 Non-resident Associates.....	60 00
" 6 Resident Juniors.....	90 00
" 13 Non-resident Juniors.....	130 00
	<hr/>
	2 955 19
	<hr/>
	19 577 46
From sales of Publications.....	1 072 74
" Certificates of Membership.....	193 25
" Advertisements	433 00
" Interest on Pennsylvania General Mortgage Bonds....	\$540 00
" Savings Bank Deposit.....	30 44
" City of New York Croton Aqueduct Stock.....	70 00
" Chicago and Northwestern Railroad Bond.....	50 00
" West Shore, New York Central Guaranteed Bonds....	100 00
" Consolidated Gas Stock.....	40 00
	<hr/>
	830 44
From Fellowship Fees	150 00
Subscriptions to Fund for Enlarged Building.....	1 860 00
Compounding Payments	650 00
Other sources	50 00
	<hr/>
	29 056 89
	<hr/>
	\$35 562 41

JANUARY PROCEEDINGS.

27

DISBURSEMENTS.

Interest on Mortgage.....	\$800 00	
Taxes.....	483 83	
Publications.....	10 508 85	
Stationery and Printing.....	1 233 82	
Postage.....	1 543 85	
Library.....	814 05	
Salaries.....	3 000 00	
Convention and Annual Meeting.....	1 417 27	
Janitor, House Supplies, Fuel, Water and Gas.....	1 724 22	
Certificates of Membership.....	138 45	
Insurance.....	71 88	
Norman Medal and Rowland Prize.....	120 50	
Finance—Treasurer's Books, General Accounts, Collections.....	1 200 00	
Work of Committees.....	467 00	
Other Expenditures ..	418 23	
		23 941 95
Purchase of Bonds for Building Fund.....		5 075 00
Transferred to Savings Bank.....		30 44
Balance on hand:		
Building Fund.....	\$1 919 50	
General Funds.....	4 595 52	
		6 515 02

\$35 562 41

The funds of the Society are as follows:

Fellowship Fund:

Ninety-two subscriptions to December 31, 1887.....	\$9 950 00
Premium and accumulated interest December 31, 1887	1 388 28
	<hr/>
Fund on hand December 31, 1887.....	\$11 338 28
One subscription during 1888.....	150 00
Interest received during 1888.....	547 00
	<hr/>
	\$12 035 28
Expended for publications during 1888.....	547 00
	<hr/>
	\$11 488 28

The present investment of the Fund is:

Nine Pennsylvania Railroad General Mortgage Six per cent. Bonds, cost.....	\$11 111 82
Portion of deposit in Seamen's Bank for Savings.....	376 46
	<hr/>
	\$11 488 28

Norman Medal Fund:

One Certificate Croton Aqueduct Stock, New York City.....	\$1 000 00
-----------------------------------------------------------	------------

Building Fund:

Receipts previous to December 31, 1885.....	\$17 842 00
---------------------------------------------	-------------

Expended:

For Legal Services, Circulars, etc.....	355 03
For Improvements on Property.....	3 486 97
Payments on Purchase.....	14 000 00
	<hr/>
	\$17 842 00

Fund for Enlarged Building:

Receipts.....	\$8 029 50
---------------	------------

This Fund comprises:

Cash.....	\$1 919 50
One Chicago and Northwestern Railroad Five per cent. Bond, cost.....	1 035 00
Five West Shore (N. Y. C. & H. R. R. Guarantee) Bonds, cost	\$5 075 00
	<hr/>
	\$8 029 50

Rowland Prize Fund:

One Pennsylvania Railroad General Mortgage Six per cent. Bond, cost.....	\$1 222 50
--------------------------------------------------------------------------	------------

General Investment:

Ten Shares Stock Consolidated Gas Company of New York, cost.....	\$972 50
Portion of deposit in Seamen's Bank for Savings.....	211 04
	<u>\$1 183 54</u>

Compounding Fund:

Six single payments for compounding dues.....	\$1 650 00
-----------------------------------------------	------------

The present investment of this Fund is:

One Pennsylvania Railroad Six per cent. General Mortgage Bond, cost.....	\$1 222 50
Portion of deposit in Seamen's Bank for Savings....	427 50
	<u>\$1 650 00</u>

Respectfully submitted,

G. S. GREENE, Jr.,
Treasurer.

REPORT OF THE COMMITTEE ON FINANCE.

The Finance Committee have the honor to report that they have performed the duty of auditing all the bills which have been paid by the Treasurer during the past year, and have found that each bill has been charged to its proper fund, and that the several sums paid have not exceeded the amounts appropriated by the Board of Direction for the purposes specifically mentioned.

They have also seen that the investments, transfers and deposits have been made as detailed in the reports of the Secretary and Treasurer.

STEVENSON TOWLE,
Chairman of Committee.

REPORT OF THE SPECIAL COMMITTEE ON UNIFORM
STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, NEW YORK,
JANUARY 16TH, 1889.

The Special Committee on Uniform Standard Time begs leave respectfully to report :

The last annual report of the Committee referred to action which had been taken by the General Time Convention the year previous, with the view of securing an expression of opinion from members of that association on the subject of the twenty-four-hour notation.

Circulars had been sent out by the Secretary of the General Time Convention, directing attention to the contents of a pamphlet issued by the American Society of Civil Engineers, setting forth the experience which up to that date had been gained on the Central and Mountain Divisions of the Canadian Pacific Railway, where the new notation had been in use for some months. A series of questions also accompanied the circular, to which members of the General Time Convention were requested to furnish replies.

The replies were referred to in the last annual report of this Committee, where, among other things, it was stated that (61) sixty-one affirmative and (38) thirty-eight negative replies had been received in reference to the question, "Are you in favor of the general adoption of the twenty-four-o'clock system of counting the hours—abandoning the use of A.M. and P.M.?"

It was deemed important to ascertain the precise character of the thirty-eight negative replies, and accordingly application was made to the Secretary of the General Time Convention, Mr. W. F. Allen, for copies of the objections which had been offered. Through the courtesy of that gentleman, the information has been received since the last Annual Meeting of this Society.

An examination of all the replies containing objections shows the following expressions of opinion, viz. :

- 6 That the A.M. and P.M. system is good enough.
- 5 That there is nothing to be gained by a change.
- 4 That the people should be educated to the new system before the railways adopt it.
- 3 That the adoption of the change would cause great confusion.
- 2 That it will be impossible to get men to understand the new notation.
- 2 That it is advisable to delay adopting the new notation until more experience is gained on the railways now using it.
- 2 That doubts are entertained if it can be brought about.
- 2 That its adoption should be delayed until all the railways are prepared to adopt the change simultaneously.

- 1 A preference is expressed for the decimal division of the day.
- 1 That midnight should be designated ZERO or O, in place of twenty-four hours.
- 1 Has difficulty in offering any serious objections to the new system.
- 1 Does not think it concerns the public very much.
- 1 That it is for the Government to authorize the adoption of the new notation rather than the railways.
- 1 Is of opinion that the change would involve great expense.
- 1 That there will be some objection to the change whenever it may be made.
- 1 Is not sufficiently familiar with the working of the new system.

The deductions from this analysis are, that of the ninety nine railway managers who in April, 1887, furnished replies to the questions placed before them, there were only six who considered the A.M. and P.M. system good enough, and only five who were then unable to recognize the advantages of the new notation. That the objections were not considered very serious by the writers of them, is evident from the fact that in twenty-one of the thirty-eight negative replies, it is stated that they will be prepared to adopt the twenty-four-hour notation if the connecting lines do the same.

The objections which have been raised are met in the most convincing manner by letters from railway men who have now had from two to three years' daily experience in the use of the new notation in operating railways. These communications are placed at the service of the Committee and comprise the following, viz.:

- 15 Letters from managers, assistant managers, superintendents and assistant superintendents.
- 7 Letters from train dispatchers.
- 8 Letters from conductors.
- 25 Letters from station masters.
- 18 Letters from track masters and track foremen.
- 2 Letters from yard masters.

There is a singular unanimity of opinion expressed in all these letters in favor of the new system. At present, your Committee cannot do better than submit the two communications which have been last received, viz.:

First.—A letter from Mr. Collingwood Schreiber, General Manager of the Intercolonial Railway of Canada, dated the 9th instant.

Second.—A letter from Mr. W. C. Van Horne, President of the Canadian Pacific Railway, dated the 10th instant.

CANADIAN GOVERNMENT RAILWAYS.

Office of the Chief Engineer and Ge

OTTAWA, January 9th, 1889.

DEAR SIR,—I have your letter of yesterday's date, making inquiry as to whether or not the twenty-four-hour system of time notation is still

in use upon the Government Railways, and if so, desiring to be informed if it gives satisfaction.

In reply I may say, the twenty-four-hour time notation was introduced upon the Inter-colonial Railway (906 miles) and the Eastern Extension Railway (80 miles) on June 13th, 1887; that it has been in most successful operation from that date to this. I anticipated at the time some trouble in having such a novelty introduced, imagining the public press and the employés of the road would combat it, but such has not been the case; not a word of complaint, so far as I am aware, has appeared in the newspapers upon the subject, and our officers and employés, as a rule, appear to view it as an advancement in the right direction, those employés immediately connected with the movement of the trains especially favoring the system. Under this time notation system no confusion can arise, and for this reason greater safety is assured.

For my own part I may say I am strongly in favor of the twenty-four-hour system of time notation, and I propose, so soon as the Oxford and New Glasgow Railway (70 miles), and the Cape Breton Railway (100 miles), now under construction, are completed and turned over to the Operating Department, to extend the system to those lines. I think it would be an advantage if it was more generally used by the railways, and I hope, at no distant day, to see its use very much extended; in fact, it appears to me it would be a great advantage if the railway managers throughout the Continent would put the twenty-four-hour system of time notation in operation upon their roads; it certainly could not but be fraught with good results. I may, however, remark that I do not think the public will readily take it up for general use until such time as it is taught in the public schools; if this was done, I believe it would very soon come into use for all purposes.

I am,

Yours very truly,

(Signed)

COLLINGWOOD SCHREIBER,
Chief Engineer and General Manager
Government Railways.

SANDFORD FLEMING, Esq.,
Chairman Special Committee on Standard Time,
Am. Soc. C. E.

CANADIAN PACIFIC RAILWAY CO.,

MONTREAL, January 10th, 1889.

MY DEAR MR. FLEMING:

Replying to your note of the 6th instant, I am happy to be able to say that our nearly three years' trial of the twenty-four-hour system on all of our lines west of the Great Lakes, embracing 2 354 miles, has been

highly satisfactory. No confusion whatever resulted from its adoption or has grown out of its use, and I have yet to hear of the first objection to it on the part of the public.

The Manitoba and North Western Railway Company, 207 miles, and the North Western C. and N. Company's Railway, 110 miles, also follow this system. It is therefore the only system used for railway purposes north of the forty-ninth parallel and west of the eighty-ninth meridian.

We hope soon to be able to extend this system over all the company's lines in the east. We should have done so before this time, if some of our neighboring lines had been in a position to join us in the movement.

A short experience with it must, I believe, convince anybody that it is vastly superior for railway purposes to the old system. It takes a surprisingly short time to come to think of twenty o'clock instead of eight o'clock P. M.

There is no danger in its adoption, even on a very busy line. The term 19.47, for instance, in a train order, cannot be mistaken for anything else.

Yours very truly,

(Signed)

W. C. VAN HORNE.

SANDFORD FLEMING, Esq., C. E., C. M. G.,

Ottawa, Ont.

These letters conclusively establish that the new notation has been thoroughly tested for two or three years on 3 657 miles of railway, that no difficulty whatever has been experienced in introducing the change, that it has been readily accepted by the public without a single objection being heard, that its extreme simplicity and the impossibility of errors resulting from its use facilitates the movements of trains and promotes the public safety. The new system having thus proved so satisfactory in every way, it has now been determined to employ it on 3 053 additional contiguous miles, which will make a total length of 6 710 miles of railway shortly to be operated under the new notation.

It is obvious that there can no longer be any doubt as to the practical advantages of the new system, and the ease with which it can be applied to the operating of any line of railway. The thirty-eight negative replies which have been cited cannot be said to present insuperable difficulties, and it is believed that the writers of them will now have their views greatly modified by the experience which has since been gained and the explanations made in the more recent letters which have been submitted.

Your Committee cannot but think that in the public interest it is advisable that renewed efforts be made to secure the general adoption of the new notation.

SANDFORD FLEMING,

Chairman Special Committee.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.	Date of Election.
FERRY, CHARLES ADDISON (Elected Junior, May 4th, 1881) First Assistant City Engineer, 18 City Hall, New Haven, Conn	Jan. 2, 1889
GIBBS, CHARLES WINGATE Chief Engineer Silverton R. R., Silverton, Colo	Jan. 2, 1889
HANDY, EDWARD ADINO Engineer Lake Shore Division, Lake Shore and Michigan Southern Ry., Cleveland, Ohio	Jan. 2, 1889
HARDY, GEORGE RICHARDSON ... 1423 Chapel st., New Haven, Conn	Nov. 7, 1888
KEEFER, GEORGE ALEXANDER... Chief Engineer Vancouver Water Works, Victoria, Brit- ish Columbia	Jan. 2, 1889
NASH, CHARLES HENRY Bloomfield, N. J.	Sept. 5, 1888
PEARL, JAMES WARREN Civil Engineer and Contractor, Canton, Ohio	Jan. 2, 1889
POWELL, CHARLES FRANCIS Captain Corps of Engineers U. S. A., 2653 Olive st., St. Louis, Mo.	Oct. 3, 1888
QUINTUS, JOHN CHARLES Erie, Pa.	Jan. 2, 1889
RICE, LEWIS FREDERICK American House, Boston, Mass.	Jan. 2, 1889
SMITH, ISAAC AUSTIN Chief Engineer St. Louis Trans- fer Ry., 24 North 3d st., St. Louis, Mo.	Oct. 3, 1888
STOREY, WILLIAM BENSON, Jr. ... Orting, Pierce Co., Wash.	Jan. 2, 1889
WEISKOPF, SAMUEL C (Elected Junior, May 7th, 1884) P. O. Box 732, Pittsburgh, Pa.	Dec. 5, 1888
WENTWORTH, WILLIAM HENRY .. Engineer in charge, Monterey and Gulf Mexico R. R., Mon- terey, Nuevo Leon, Mexico..	Jan. 2, 1889

JUNIOR.

WARNER, CHARLES ST. JOHN ... 132 Broadway, New York City.	Jan. 2, 1889
-----------------------------------------------------------	--------------

FELLOW.

HILL, JAMES J. President St. Paul, Minneapolis and Manitoba R. R., St. Paul, Minn.	Jan. 10, 1889
----------------------------------------------------------------------------------------------------	---------------

CHANGES AND CORRECTIONS.

BARLOW, JOHN Q	(Care V. G. Bogue, Chief Engineer Union Pacific Ry.), Omaha, Neb.
BRYSON, ANDREW	(Shunk & Bryson), 60 Broadway, Room 324, New York City.
DELAFIELD, CLARENCE	West New Brighton, Richmond Co., N. Y.
DOANE, WALTER A.	Engineer of Bridges, Oregon Pacific R. R., Corvallis, Ore.
DONOVAN JOHN J.	Bellingham, Wash.
FRIZELL, JOSEPH P	U. S. Engineers' Office, Nashville, Tenn.
FTELEY, ALPHONSE	Chief Engineer Aqueduct Commission, 213 Stewart Building, New York City.
FULTON, JOHN A	Oliver House, Toledo, Ohio.
GERBER, EMIL	Resident Engineer Jacksonville Bridge Co., Jacksonville, Fla.
HEGEMAN, ALLEN B	Division Engineer Interoceanic Ry., Tepeyahualco, Puebla, Mexico.
HODGES, ARTHUR	Chief Engineer Johnson Co., Johnstown, Pa.
JOHNSTON, HORACE G	Salina, Kansas.
MAXIM, HIRAM S.	Crayford, Kent, England.
McKEE, SAMUEL B	Moriah Centre, Essex Co., N. Y.
McLAIN, LOUIS R.	Contractor for Alabama Midland Ry., Bainbridge, Ga.
MILLER, J. IMBRIE	Box 807, Pueblo, Colo.
MINTURN, ROWLAND R	Shoreham, Addison Co., Vt.
MORSE, CHARLES J.	821 27th st., Denver, Colo.
MORSE, HENRY G.	President Edge Moore Bridge Works, Edge Moore, Del.
NEWHAM, CHARLES E.	530 West 156th st., New York City.
OLNEY, GEORGE R.	242 West 43d st., New York City.
OPDYKE, STACY B., JR.	General Superintendent Hartford and Connecticut Western R. R., Hartford, Conn.
PEARY, ROBERT E.	Civil Engineer U. S. N., Office of Nicaragua Canal Co., 36 Wall st., New York City.
PRENDERGAST, FRANCIS E.	Sault Ste. Marie, Mich.
RIFFLE, FRANKLIN	Chief Engineer Oregon and Washington Territory R. R., Walla Walla, Wash.
ROWE, SAMUEL M.	Chief Engineer Western Division Atlantic and Pacific R. R., Albuquerque, N. M.
SEDGWICK, THOMAS S.	Florence Hotel, San Diego, Cal.
SEYMOUR, CHARLES.	Madisonville, Hopkins Co., Ky.
SHINN, WILLIAM P.	Vice-President New York and New England R. R., 36 Wall st., New York City.
SMITH, JOSEPH S.	56 West 45th st., New York City.
TALCOTT, COOK	The Hudson Suspension Bridge and New England Ry., 38 Wall st., New York City.

- UNTHANK, ACHILLES W.....Chief Engineer San Joaquin Land and Water
Co., Knight's Ferry, Cal.
WATSON, WILLIAM P.....(Care Oregon Railway and Navigation Co.),
Portland, Ore.
WIGHTMAN, WILLARD H.....Assistant Engineer Spokane and Palouse Ry.,
Ashland, Ore.

ASSOCIATE.

- STONE, WATERMAN.....General Manager Inter-State Consolidated
Rapid Transit Ry., Kansas City, Mo.

JUNIORS.

- BENSEL, JOHN A.....Assistant Supervisor Division A, Pennsylvania
R. R., Taylor's Hotel, Jersey City, N. J.
GOSLING, EDGAR B.....(Care E. Coignet), 98 rue Demours, Paris,
France.
MOULTHROP, GEORGE E.....(Ray and Moulthrop), Civil and Mining En-
gineers, Butte, Mont.
YOUNG, HERBERT A.....(Care E. R. Comfort), Division Superintendent
Mexican Central Ry., El Paso, Texas.

RESIGNATIONS.

- CHAPHE, ANDREW J.....December 31, 1888
GORDON, ALEXANDER.....December 31, 1888

DEATHS.

- BLUNDEN, HENRY D.....Elected Junior January 5, 1876; elected Mem-
ber February 4, 1880; died January 7, 1889.
ELLIS, NATHANIEL W.....Elected Member February 2, 1881; died Janu-
ary 16, 1889.
LESAGE, LOUIS.....Elected Member September 7, 1881; died Jan-
uary 9, 1889.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV.—February-March, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

FEBRUARY 6TH, 1889.—The Society met at 20 o'clock, Thomas J. Whitman, M. Am. Soc. C. E., in the Chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: Samuel Lispenard Cooper, Yonkers, N. Y.; Sören Theodor Munch Bull Kielland, Buffalo, N. Y.; Samuel Clarence Thompson, New York City; Frank Herbert Todd, St. Cloud, Minn.; Schuyler Skaats Wheeler (elected Junior March 2d, 1887), New York City. As Associate: James Frederick Lewis, New York City. As Juniors: James Benton French, Philadelphia, Pa.; George King McCormick, Johnson City, Tenn.

On motion, it was resolved that a special ballot for reconsideration of a rejected candidate, announced for canvass at this meeting, be declared informal, and the whole matter be referred to the Board of Direction for consideration.

The death of Henry D. Blunden, M. Am. Soc. C. E., on January 7th, 1889; the death of Nathaniel W. Ellis, M. Am. Soc. C. E., on January 16th, 1889; the death of Samuel M. Felton, F. Am. Soc. C. E., on January 24th, 1889; and the death of Louis Lesage, M. Am. Soc. C. E., on January 9th, 1889, were announced.

The Secretary announced the election to Fellowship, on January 10th, 1889, of Mr. James J. Hill, of St. Paul, Minn.

The Secretary announced the presentation to the Society by W. H. Jennings, M. Am. Soc. C. E., of a Generalized Section of the Coal Meastres of Southern Ohio.

A table showing the cost of horse-power on street railways in New York and Brooklyn, by G. Leverich, M. Am. Soc. C. E., was read by the Secretary.

A paper on "The Improvement of Channels in Sedimentary Rivers," by Mr. George H. Henshaw, was read by the Secretary.

FEBRUARY 20TH, 1889.—By invitation of the American Institute of Mining Engineers, the Society attended the meeting of that Institute at Hardman Hall, at which occurred a discussion on Iron and Steel.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

	Date of Election.
BROWN, ELBRIDGE LEONARD....Room 14, City Block, Brockton, Mass	Sept. 5, 1888
COOPER, SAMUEL LISPENARD....Box 767, Yonkers, N. Y.....	Feb. 6, 1889
FITZ GERALD, JOHN LELAND....5 Central Arcade, Schenectady, N. Y.....	Jan. 2, 1889
KIELLAND, SÖREN THEODOR	
MUNCH BULL.....Care Lehigh Valley R. R., Buffalo, N. Y.....	Feb. 6, 1889
McCLINTOCK, WILLIAM EDWARD.City Engineer, Chelsea, Mass...	Dec. 5, 1888
NICHOLS, NORMAN JAMES.....Honda, Republic of Colombia..	Dec. 5, 1888
THOMPSON, SAMUEL CLARENCE..832 East One Hundred and Sixty-first st., New York City.....	Feb. 6, 1889
TODD, FRANK HERBERT.....City Engineer, St. Cloud, Minn.	Feb. 6, 1889
WHEELER, SCHUYLER SKAATS...(Elected Junior, March 2, 1887), 322 Seventh ave., New York City.....	Feb. 6, 1889

ASSOCIATE.

LEWIS, JAMES FREDERICK.....Rand Drill Co., 23 Park place, New York City.....	Feb. 6, 1889
------------------------------------------------------------------------------	--------------

JUNIORS.

ALLEN, THOMAS WARREN.....129 West Sixty-first st., New York City.....	Dec. 5, 1888
FRENCH, JAMES BENTON.....626 North Fortieth st., Philadelphia, Pa.....	Feb. 6, 1889
McCORMICK, GEORGE KING....Assistant Engineer, Charleston, Cincinnati and Chicago R. R., Johnson City, Tenn.....	Feb. 6, 1889
POLLEDO, YSIDORO YGNACIO....Cardenas, Cuba.....	Jan. 2, 1889

CHANGES AND CORRECTIONS.—MEMBERS.

APPLETON, ELLERY C.....	Revere, Mass.
CRAIG, CHAMBERS M.....	Principal Assistant Engineer Alabama Midland Ry., Bainbridge, Ga.
CUNNINGHAM, JAMES H.....	26 Victoria st., London, S. W., England.
GREENE, JOSEPH N.....	Bangor, Maine.
HENNY, DAVID C.....	(With Howland & Ellis), 71 Equitable Building, Boston, Mass.
HUGHES, WILLIAM M.....	Assistant General Manager Keystone Bridge Co., Pittsburgh, Pa.
McKEE, CHARLES H.....	Whitehall, N. Y.
McLAIN, LOUIS R.....	Contractor for Alabama Midland Ry., Ozark, Ala.
MOORE, ROBERT.....	Chief Engineer St. Louis Merchants Bridge Terminal Ry., Laclede Building, St. Louis, Mo.
NICHOLS, OTHNIEL F.....	Chief Engineer Union and Brooklyn Elevated Ry., 31 Sands st., Brooklyn, N. Y.
PARKHURST, HENRY W.....	Resident Engineer St. Louis Merchants Bridge, 64 Laclede Building, St. Louis, Mo.
SCHAUB, JULIUS W.....	Engineer Detroit Bridge and Iron Works, Detroit, Mich.
WHITFORD, OSCAR F.....	Casilla, 34 D., Santiago, Chili.

ASSOCIATE.

HANDY, FRANK W.....	Avondale, Cincinnati, Ohio.
---------------------	-----------------------------

JUNIORS.

GAHAGAN, WALTER H.....	Assistant Engineer St. Louis Merchants Bridge, 64 Laclede Building, St. Louis, Mo.
HILDRETH, RUSSELL W.....	Box 93, Phoenixville, Pa.
LANT, FRANK P.....	243 West One Hundred and Thirty-third st., New York City.
MODJESKI, RALPH.....	(Care Morison & Corthell), 205 La Salle st., Chicago, Ill.
MYERS, EDMUND T. D., JR.....	Assistant to President Richmond Locomotive and Machine Works, Richmond, Va.
PURDY, CORYDON T.....	168 Washington st., Chicago, Ill.
VAUGHAN, GEORGE W.....	Division Engineer New York, Chicago and St. Louis Ry., Broadway Depot, Cleveland, Ohio.

RESIGNATIONS.

DANA, JAMES J.....	December 31, 1888
MARTIN, WILLIAM H.....	December 31, 1888

DEATHS.

- BARBOUR, WILLIAM S. Elected Member April 17, 1872; died February 24, 1889.
- BAUMANN, EDWARD. Elected Associate June 2, 1880; died January 23, 1889.
- FELTON, SAMUEL M. Elected Fellow March 23, 1870; died January 24, 1889.
- PHILBRICK, EDWARD S. Elected Member September 6, 1874; died February 13, 1889.

March, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MARCH 6TH, 1889.—The Society met at 20 o'clock, President M. J. Becker in the Chair; John Bogart, Secretary. Ballots were canvassed and the following candidates declared elected. As Members: Walter Linsley Cowles, Cleveland, O.; Paul Didier, Pittsburgh, Pa.; Herbert Samuel Holt, Sherbrooke, Canada; William Charles Kernot, Melbourne, Australia; Henry Kinder Owens, Seattle, Wash.; Andrew McClean Parker, New York City; Albert Hezekiah Porter, Cleveland, O.; Walter Percival Rice, Cleveland, O. As Juniors: Stewart Johnston, Pittsburgh, Pa.; Augustus Sayre Kibbe, Albany, N. Y.; Walter Frank Whittemore, Hoboken, N. J.

The Secretary announced the death of William S. Barbour, M. Am. Soc. C. E., on February 24th, 1889; the death of Edward Baumann, Assoc. Am. Soc. C. E., on January 23d, 1889, and the death of Edward S. Philbrick, M. Am. Soc. C. E., on February 13th, 1889.

The Norman Medal for the year ending August 1st, 1888, awarded to E. E. Russell Tratman, Jun. Am. Soc. C. E., for his paper on "English Railroad Track," was presented to Mr. Tratman.

A discussion of the paper on "English Railroad Track," by James H. Cunningham, M. Am. Soc. C. E., was read by the Secretary, and the subject was discussed by Messrs. Sloan, T. C. Clarke, Becker, Croes, Brendlinger, Wegmann, Devin, Buck and Tratman.

MARCH 20TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair.

Announcements were made by the Chairman of the Committee in charge of arrangements for the proposed European trip, Dr. Charles E. Emery, as to the progress of those arrangements.

Some twenty pictures of the construction of the Forth Bridge, presented by Charles Macdonald, M. Am. Soc. C. E., were shown by means of the stereopticon, and the subject was discussed by Messrs. Charles Macdonald, William H. Paine, T. C. Clarke, H. W. Brinckerhoff, Theodore Cooper and J. H. Staats.

OF THE BOARD OF DIRECTION.

JANUARY 3D, 1889.—Applications were considered. Committee on Annual Meeting was appointed. The report of the Committee on the proposed addition to the Society House was considered, and it was, on motion, resolved that the erection, under the direction of the Committee, be ordered, at an expense not to exceed \$5 000. Appropriations were made.

JANUARY 15TH, 1889.—Arrangements for Annual Meeting were considered. Annual Report adopted.

FEBRUARY 7TH, 1889.—Applications were considered. Appropriations were made. The subject of original papers for the Transactions was considered. Financial business transacted.

MARCH 7TH, 1889.—Applications were considered. The subject of the time and place for the next Annual Convention was considered.

MEMOIRS OF DECEASED MEMBERS.

GEORGE AINSLIE, F. Am. Soc. C. E.

DIED SEPTEMBER 6TH, 1878.

George Ainslie, F. Am. Soc. C. E., died at Louisville, Ky., September 6th, 1878. He was born in Edinburgh, Scotland, in 1814, and came to Louisville in 1826, with his father, Hew. Ainslie, the Scottish poet, who died at Louisville in 1879.

Mr. George Ainslie, soon after arriving in Louisville, became an apprentice in the old Franklin foundry of the firm of Glover, McDougal & Co. After his service as an apprentice, he acted on his own account as a mechanic for several years, and then became a partner in the foundry firm of Inman, Gault & Co., which afterward was succeeded by Glover,

Gault & Co., and, in 1854, by Glover, Ainslie & Cochran. Subsequently Messrs. Ainslie and Cochran established a firm which continued under the name of Ainslie, Cochran & Co. up to the time of Mr. Ainslie's death.

Mr. Ainslie was successful in his business life; his practical knowledge of mechanics, added to the experience of years, enabled him to take charge of large interests. He was very liberal in his business relations and took a prominent part in the general affairs of the city in which he spent his life. He was a member of the City Council and a director in a number of the larger business interests of Louisville. He was prominent in the management of the Louisville Water Company, a director of the Short Line Railway Company and a manager of the House of Refuge. The general expression of regret which occurred on the occasion of Mr. Ainslie's death showed the very high appreciation in which he was held in the City of Louisville.

GILMAN TRAFTON, M. Am. Soc. C. E.

DIED MAY 25TH, 1887.

Near one of the quiet avenues which wind between lofty trees that shade the grassy slopes of Cave Hill Cemetery, the beautiful City of the Dead, near Louisville, Ky., is the grave of Gilman Trafton, a Member of the American Society of Civil Engineers since May 15th, 1872.

He was the son of Leonard F. and Sarah H. Trafton, and was born at New Market, N. H., October 11th, 1835.

After a preparatory course at Bangor, Me., he entered the Rensselaer Polytechnic Institute at Troy, N. Y., in October, 1853, and graduated with high honors in the class of 1856.

For a short time he was employed as an assistant by Smith & Parkinson, Civil Engineers at Buffalo, N. Y., and then removed to Nashville, Tenn., where he obtained employment in the office of Mr. Adna Anderson, at that time chief engineer of different lines of railroad centering at Nashville.

In November, 1858, Professor O. H. P. Bennett, who had been selected as the engineer on the part of the State of Tennessee in the establishment of the boundary line between that State and Kentucky, offered Mr. Trafton the position of assistant. This he accepted, and performed the duties until about March 1st, 1859, when he was appointed the engineer on the part of Kentucky upon the same survey. The work was com-

pleted in November, 1859, the entire boundary line from the Mississippi River to Cumberland Gap having been carefully located and permanently marked during the twelve months that the party was in the field.

Mr. Trafton then accepted the position of assistant with Mr. J. H. Devereux, who was then City Engineer of Nashville, Tenn., and remained until the outbreak of the war in April, 1861.

From this time until Nashville was occupied by the armies of the United States Mr. Trafton was engaged in military surveys, with a view to the construction of defensive works around the City of Nashville, by the State of Tennessee.

Subsequently he was in the Military Railroad Service, and from February, 1864, until the close of the war he was assistant to General Superintendent Government Railroads, Military Division of the Mississippi.

In the summer of 1865 he removed to Louisville, Ky., and participated in the formation of the Louisville Bridge and Iron Company, of which he was the engineer from its organization until shortly before his death.

It is said of him by one eminent in the same profession that he "had few equals as a bridge engineer." His rapid and accurate work, his correct judgment, and his habits of laborious, untiring industry were proverbial, and his early death was doubtless due to excessive professional overwork.

In December, 1885, he left New York for Japan in a sailing vessel, with the hope of throwing off a threatened softening of the brain. Returning in July, 1886, but little benefited, he remained at Louisville, unable to participate in business affairs, until the disease mastered him and he died May 25th, 1887.

Mr. Trafton was never married, and it only remains to bear willing testimony to his high personal qualities as a man. In the language of an old associate, "he was a noble man, strict and correct in all his dealings, kind and courteous in all his intercourse." Modest and unassuming, his integrity and uprightness of character were beyond reproach, his kindness as gentle as that of a woman, and his devotion to friends like bars of triple steel.

FREDERIC WILLIS VAUGHAN, M. Am. Soc. C. E.

DIED OCTOBER 19TH, 1887.

Frederic Willis Vaughan, son of Lewis and Susan J. Vaughan, was born in Warren, Knox County, Me., on January 16th, 1844. He was prepared at the academy in Warren for admission to the Rensselaer Polytechnic Institute, from which he graduated with high honors in the class of 1863.

During the fall of 1863 he received the appointment of Third Assistant Engineer in the United States Navy. This position he resigned before having been assigned to duty, in order to accept the position of Assistant Engineer in the United States Military Railway Service, with headquarters at Nashville, Tenn. Arriving at Nashville in January, 1864, remained in the Government Railway Service until October, 1865, at which time he removed to Louisville, Ky., and entered the employment of the Louisville Bridge and Iron Company as Assistant Engineer. He remained in this position until the commencement of work on the Ohio River Bridge, at Louisville, of which he became Principal Assistant Engineer.

Owing to the failure of the contractors for the masonry to proceed promptly with their work, the Bridge Company assumed the task of construction, and the entire work was intrusted to the personal direction and supervision of Mr. Vaughan. Though scarcely twenty-five years of age, he displayed such marked qualities as an engineer and as a man of executive ability as to place him in the front rank of those capable of conducting large enterprises.

On the completion of the Ohio River Bridge Mr. Vaughan returned, January 16th, 1871, to the service of the Louisville Bridge and Iron Company, as Engineer. He became a Director of this Company, and was elected Vice-President and Chief Engineer April 1st, 1873, and President March 15th, 1879. From this time to the day of his death he controlled and directed the affairs of the company, which has, under his direction, designed and built numberless bridges, amounting in total length to upwards of 20 miles.

From July 18th, 1881, to December 21st, 1883, Mr. Vaughan served as arbitrator on the part of the Louisville Gas Company in the matter of differences between the Gas Company and the City of Louisville, relative to charges for public lights. This work was conducted in the thorough manner which characterized his treatment of any subject, and resulted in an agreement by which settlement was made between the city and the Gas Company.

Committee to prepare Memoir—Mr. Albert Fink, M. Am. Soc. C. E.; Mr. O. F. Nichols, M. Am. Soc. C. E.; and Mr. J. W. Putnam, M. Am. Soc. C. E.

He was consulting engineer of the Henderson Bridge Company from September 28th, 1881, to April 1st, 1882, when this office was abolished, and he became Chief Engineer, retaining this position until his death. The design and execution of this work interested him exceedingly. His familiarity with the Central Southern States and their railroad interests made him realize the importance of this structure as a feature of the railroad systems between the Central, South, and the North and West, and led him to endeavor to make this bridge a work of strength and utility. It stands to-day a monument to his personal energy and professional attainments.

On January 1st, 1883, Mr. Vaughan was made Consulting Engineer of the Louisville and Nashville Railroad Company, and held the position till his death. Under his supervision nearly all the more important bridges of this railroad system were reconstructed to meet the requirements of increased traffic and the consequent use of heavier locomotives.

In the spring of 1884, during the construction of the Henderson Bridge, Mr. Vaughan had a severe attack of pneumonia, from which he never fully recovered. After this illness he was obliged to spend his winters in the South, and his health was so shattered that he worked at great disadvantage in carrying his important works to completion.

On September 26th, 1887, while inspecting the construction of the foundation for a heavy machine at the works of the Louisville Bridge and Iron Company, he was taken suddenly ill and nearly died of suffocation, from which he had suffered greatly at intervals.

From this time he was practically confined to the house, though confined to his room but a few days previous to his death. His chief suffering during his last illness was from a severe cough and from shortness of breath. He died of dilation of the heart at Louisville, Ky., on October 19th, 1887, at 3.30 A. M., and was buried at Cave Hill Cemetery.

Mr. Vaughan was married May 3d, 1869, to Margaret D. Edgar, of St. John, New Brunswick, who with their two sons, Edgar and Walter Lewis, survives him.

He became a member of the American Society of Civil Engineers on February 17th, 1869, and was elected a director in 1885.

Of a strong social and domestic disposition, Mr. Vaughan was an ideal husband and father; he made friends easily; his friendships were strong, and his devotion to them great.

His loyalty and devotion to the various interests which demanded his attention was unqualified, and his consideration of his business associates was as great as is often found in a man so intensely devoted to business interests.

His strong personality and untiring energy, limited only by his physical strength, made him easily one of the foremost Engineers of the

Central States of Kentucky and Tennessee during the period from 1879 to the day of his death.

Possessed of a quick intellect and a wonderful memory, his engineering talent was exceeded by his business capacity. His loss is deeply felt by a large circle of friends, and will not be easily made good in the several positions which he had filled with so much credit to himself and such advantage to the interests involved.

SPRINGER HARBAUGH, F. Am. Soc. C. E.

DIED DECEMBER 8TH, 1887.

Mr. Springer Harbaugh, a Fellow of the American Society of Civil Engineers, died at his residence in St. Paul, Minn., on December 8th, 1887.

The deceased was born at New Lisbon, Ohio, March 16th, 1816. In 1840 he removed to Pittsburgh, Pa., where he first engaged in the commission business, and afterward became very largely identified with the iron trade, being one of the proprietors of the Superior Rail Mill, then considered the largest in the country. Mr. Harbaugh was one of the two original Directors of the Union Pacific Railroad appointed by President Lincoln. He was re-appointed by President Johnson, when the number was increased to five. He was a Director of the Pittsburgh, Fort Wayne and Chicago Railroad, and was also officially connected with banks both in Pittsburgh and New York City. In 1880 Mr. Harbaugh removed to Minnesota and took charge of two of the largest farms in the Northwest, and the last years of his life were actively devoted to the advancement of Agriculture. He was a member of the Advisory Board of the State Agricultural College, and for three years Vice-President for Minnesota of the Farmers' National Congress, at whose session in November, 1887, in Chicago, he contracted the illness from which he died. He was a firm believer in the agricultural resources of the Northwest, and especially that portion with which he was most familiar, the Red River Valley. All who had the privilege of knowing Mr. Harbaugh will most cordially concur in the sentiments expressed in the following tribute to his memory, contributed to the *Pioneer Press* by an old friend of the deceased:

"It seems scarcely right that a life so full of kind thoughts and generous deeds should pass from among us without some recognition on

Committee to prepare Memoir, Mr. L. L. C. Brooks.

the part of those who have been favored with his friendship and have enjoyed his society.

"His public record belongs to the City of Pittsburgh, where he lived for more than forty years, and is associated to no inconsiderable extent with the history of the State of Pennsylvania. More than one successful business man, who owes his start in life to the practical character of Mr. Harbaugh's sympathy, still lives to bear witness to his value as a friend and counsellor."

His remains were interred at Pittsburgh, where the news of his death caused general regret.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

	Date of Election.
COWLES, WALTER LINSLEY.....Engineer King Iron Bridge and Manufacturing Co., Cleve- land, Ohio.....	March 6, 1889
DIDIER, PAUL.....Chief Engineer Pittsburgh and Western Ry., Allegheny, Pa.	March 6, 1889
PORTER, ALBERT HEZEKIAH.....Engineer King Iron Bridge and Manufacturing Co., Cleve- land, Ohio.....	March 6, 1889
RICE, WALTER PERCIVAL.....City Civil Engineer, Cleveland, Ohio.....	March 6, 1889

ASSOCIATE.

TRAUTWINE, JOHN CRESSON, Jr..3301 Haverford st., Philadelphia, Pa.....	Dec. 5, 1888
---------------------------------------------------------------------------	--------------

JUNIOR.

WHITTEMORE, WALTER FRANK...308 Garden st., Hoboken, N. J.,	March 6, 1889
------------------------------------------------------------	---------------

CHANGES AND CORRECTIONS.

BOOTH, WILLIAM H.....40 Upper Tollington Park, Finsbury Park, London, N., England.	
BRYSON, ANDREW.....12 Broadway, Room 44, New York City.	
CARREL, FREDERICK J.....Spokane Falls, Wash.	

HOXIE, R. L.....	Capt. Corps of Engineers U. S. A., Willets Point, Whitestone P. O., N.Y.
JACKSON, JONES M.....	Schenectady, N. Y.
LONG, THOMAS J.....	80 Washington Square, East, New York City.
MILLER, SILVANUS.....	Superintendent Chinamit Mine, Las Quebrados, Isabal, Guatemala, Central America.
OSGOOD, JOSEPH O.....	120 Broadway, New York City.
POU, ARTHUR.....	Talbotton, Ga.
RUGGLES, WILLIAM B.....	Fern Bank, Hamilton Co., Ohio.
SAFFORD, EDWARD S.....	Chief Engineer Shelby Iron Works, Shelby, Ala.
SHEARER, SAMUEL H.....	Engineer National Vulcanite Co., Ingalls Block, Room 7, Indianapolis, Ind.
SIMPSON, GEORGE F.....	220 West One Hundred and Twenty-fourth st., New York City.
SMITH, WILLIAM SOOY.....	Maywood, Cook Co., Ill.
SPENCER, SAMUEL.....	(Care Drexel, Morgan & Co.), cor. Wall and Broad sts., New York City.
THOMPSON, WILLIAM G. M....	Resident Engineer Sault Ste. Marie Canal, Sault Ste. Marie, Ontario, Canada.
WASHBURN, FRANK S.....	(Care Munroe & Co.), Paris, France.
WATKINS, FREDERICK W.....	118 East One Hundred and Fifteenth st., New York City.
YEATMAN, CHARLES P.....	Coalburg, Ala.

JUNIORS.

ADAMS, JULIUS L.....	(Care Panama R. R.), Colon, U. S. Colombia.
LUCAS, D. JONES.....	Lock Box 1142, Corry, Pa.
PRATT, MASON D.....	(Tselingi & Pratt), Dubuque, Iowa.
ROSENWEIG, ALFRED.....	Chief Engineer "La Mexicana" Land and Mining Co., Mulegé, Baja California, Mexico.
YATES, PRESTON K.....	Natchez, Miss.

DEATHS.

ALLIS, EDWARD P.....	Elected Fellow August 4, 1883; died April 1, 1889.
ERICSSON, JOHN.....	Elected Honorary Member October 2, 1879; died March 8, 1889.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV, April-May-June-July, 1889,

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

APRIL 3D, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary. Ballots for membership were canvassed and the following candidates were declared elected: Willard Beahan, St. Louis, Mo.; Edward Josiah Blake, St. Joseph, Mo.; Horace Joshua Campbell, Chicago, Ill.; William Watson Coe, Roanoke, Va.; Fayette Samuel Curtis, New Haven, Conn.; John Ripley Freeman (elected Junior June 7th, 1882), Boston, Mass.; Franz Germann, Colon, Isthmus Panama; Frank Pierce King, Denver, Col.; John Nicholas Pott, Wilkesbarre, Pa.; John James Robinson, Johnson City, Tenn.; Martinus Stixrud, Seattle, Wash.; Timothy Sidney White, Beaver Falls, Pa. As Juniors: William Bion Ewing, Chicago, Ill.; Elstner Fisher, Detroit, Mich.; John Edgar Griffith, Donald, British Columbia; Clifford Stephen Kelsey, New York City; Curtiss Millard, Yonkers, N. Y.; Benno Rohnert, Detroit, Mich.

The Secretary announced the death on April 1st, 1889, of Edward P. Allis, F. Am. Soc. C. E., and the death of John Ericsson, Hon. M. Am. Soc. C. E., on March 8th, 1889.

A paper by Emil Kuichling, M. Am. Soc. C. E., on the "Relation between the Rainfall and the Discharge of Sewers in Populous Districts," was read by the Secretary, and discussed by Messrs. Rudolph Hering, Chas. P. Brush and A. Fteley.

APRIL 17TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair; John Bogart, Secretary. A paper on the Improvement of the Mississippi River, by William Starling, M. Am. Soc. C. E., was read and discussed by Messrs. Emery, Striedinger, T. C. Clarke, Collingwood, C. J. H. Woodbury, Worthen, and H. W. Brinckerhoff.

Mr. Herman Schussler, C. E., exhibited by request drawings and plans of engineering constructions executed under his direction on the Pacific coast, and explained them in detail.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

	Date of Election.
BARTLETT, WINTHROP,.....Engineer in charge Olive st. Cable Line, Missouri R. R., 3303 Olive st., St. Louis, Mo.....	Jan. 2, 1889
BEAHAN, WILLARD.....North and South American Construction Co., Calle de la Moneda 38, Santiago, Chili..	April 3, 1889
BLAKE, EDWARD JOSIAH.....Chief Engineer Hannibal and St. Joseph R. R., and Kansas City, St. Joseph and Council Bluffs R. R., St. Joseph, Mo.	April 3, 1889
COE, WILLIAM WATSON.....Chief Engineer Norfolk and Western R. R., Roanoke, Va.	April 3, 1889
CURTIS, FAYETTE SAMUEL.....Chief Engineer New York, New Haven and Hartford R. R., New Haven, Conn.....	April 3, 1889
FREEMAN, JOHN RIPLEY.....(Elected Junior, June 7, 1882.) Hydraulic Engineer and Inspector Associated Factory Mutual Insurance Co., 31 Milk st., Boston, Mass.....	April 3, 1889
HOLT, HERBERT SAMUEL.....Sherbrooke, Quebec, Canada...	March 6, 1889
KING, FRANK PIERCE.....Assistant Chief Engineer Denver and Rio Grande Ry., 17 Cheesman Block, Denver, Colo.....	April 3, 1889
LANDRETH, WILLIAM BARKER...Constructing Engineer, Sewer Commissioners, Amsterdam, N. Y.....	Oct. 3, 1888

POTT, JOHN NICHOLAS.....	Mining Engineer Wyoming Div. Lehigh and Wilkes-Barre Coal Co., Wilkes-Barre, Pa.....	April 3, 1889
STIXRUD, MARTINIUS.....	Engineer Construction, Seattle, Lake Shore and Eastern Ry., Seattle, Wash.....	April 3, 1889
STONE, EDWARD HERBERT.....	In charge Construction Section, Office Director-General of Railways, Simla, India.....	Dec. 5, 1888

ASSOCIATE.

WATKINS, JOHN ELFRETH	Engineer Property and Curator, Section Transportation and Engineering, U. S. National Museum, Washington, D. C.	Jan. 2, 1889
-----------------------------	--------------------------------------------------------------------------------------------------------------------------	--------------

JUNIORS.

EWING, WILLIAM BION.....	Assistant Engineer Chicago and North Western Ry., 4136 Ellis ave., Chicago, Ill.....	April 3, 1889
FISHER, ELSTNER.....	Assistant Engineer Michigan Central R. R., Detroit, Mich.	April 3, 1889
GRIFFITH, JOHN EDGAR.....	Resident Engineer Canadian Pacific Ry., Donald, B. C...	April 3, 1889
KELSEY, CLIFFORD STEPHEN ...	82 Army Building, New York City.....	April 3, 1889
MILLARD, CURTISS	(Care D. R. Paige & Co.) Brews- ter, N. Y.....	April 3, 1889
ROHNERT, BENNO	U. S. Engineers' Office, Sault Ste. Marie, Mich.....	April 3, 1889
WOOD, CHARLES FRANCIS.....	Assistant in City Engineer De- partment, 18 City Hall, New Haven, Conn.....	Dec. 5, 1888

CHANGES AND CORRECTIONS.

MEMBERS.

AMWEG, FREDERICK J.....	Chief Engineer City Ave. and Germantown Bridge Co., Keystone Bank Bldg., Philadel- phia, Pa.	
APPLETON, THOMAS.....	Resident Engineer Union Pacific Ry., Omaha, Neb.	
ATWOOD, WILLIAM H.....	79 Adelbert st., Cleveland, Ohio.	
BALDWIN, WILLIAM J.....	Advisory Engineer Warming and Ventilating Buildings, etc., 277 Pearl st., New York City.	

- BAXTER, GEORGE S.....Treasurer Northern Pacific R. R., 17 Broad st., New York City.
- BECKWITH, LEONARD F.....Chief Engineer Consolidated Telegraph and Electrical Subway Co., 18 Cortlandt st., New York City.
- BILLIN, CHARLES E.....95 Fifth ave., Room 63, Pittsburgh, Pa.
- BLACKFORD, FRANCIS W., JR....Anaconda, Mont.
- BLICKENSERFER, JACOB.....Consulting Engineer Union Pacific Ry., Oakland, Mo.
- BLICKENSERFER, ROBERT.....Oakland, Mo.
- BONZANO, MAXIMILIAN F.....Superintendent Philadelphia and New York Div. Philadelphia and Reading R. R., 900 Green st., Philadelphia, Pa.
- BOOTH, WILLIAM H.....Mechanical Engineer London Central Subway Ry., Leadenhall House, London, E. C., England.
- BRACKENRIDGE, WILLIAM A. ...Toms River, Ocean Co., N. J.
- BRINCKERHOFF, H. WALLER....Office of *The Engineering and Building Record*, 277 Pearl st., New York City.
- BRINSMADE, DANIEL S.....Engineer Ousatonic Water Co., Birmingham, Conn.
- BRODHEAD, CALVIN E.....Lehigh Coal and Iron Co., cor. Third and Cedar sts., St. Paul, Minn.
- BURNET, GEORGE.....Street Commissioner, St. Louis, Mo.
- CHILDS, JAMES E.....Assistant General Manager Lake Shore and Michigan Southern R. R., Cleveland, Ohio.
- COFFIN, WILLIAM B.....Superintendent New York, Lake Erie and Western R. R., Susquehanna, Pa.
- COMSTOCK, CYRUS B.....Col. Corps of Engineers, Bvt. Brig.-Gen. U. S. A., Army Bldg., New York City.
- CONSTABLE, CASIMIR.....Constableville, N. Y.
- CORNELL, OLIVER H. P.....Chief Engineer Cincinnati, Alabama and Atlantic R. R., Tullahoma, Tenn.
- DELAFIELD, CLARENCE.....2 Wall st., New York City.
- DEYO, S. L. F.....Assistant Engineer New York, New Haven and Hartford R. R., 10 East One Hundred and Nineteenth st., New York City.
- DU BARRY, JOSEPH N.....Second Vice-President Penn. R. R., 233 South Fourth st., Philadelphia, Pa.
- DUN, JAMES.....Chief Engineer St. Louis and San Francisco R. R., Seventh and Cerre sts., St. Louis, Mo.
- EGGLESTON, T. C.....Engineer Maintenance of Way, Chesapeake and Ohio Ry., Richmond, Va.
- ENGLE, ROBERT L.....Lincoln ave., Walnut Hills, Cincinnati, Ohio.
- FILLEY, HIEL H.....Chief Engineer Mexican National Construction Co., Security Bldg., Kansas City, Mo.
- FISHER, EDWIN A.....Division Engineer Maintenance of Way Western New York and Penn. R. R., and Chief Engineer Rochester Electric Ry., Rochester, N. Y.

- FLAD, EDWARD.....Civil and Mechanical Engineer, Laclede Bldg.,
St. Louis, Mo.
- FORNEY, MATTHIAS N.....Editor *Railroad and Engineering Journal*, 145
Broadway, New York City.
- FOUQUET, JOHN D.....Architect New York Central and Hudson River
R. R., Room 21, Grand Central Station,
New York City.
- FULTON, JOHN A.....Resident Engineer Toledo, St. Louis and Kan-
sas City R. R., Toledo, Ohio.
- GILBERT, CHARLES P.....Secretary and Manager Edison Illuminating
Co., Detroit, Mich.
- GILLHAM, ROBERT.....19 Gibraltar Bldg., Kansas City, Mo.
- GOLDMARK, HENRY.....Engineer Bridges Kansas City, Ft. Scott and
Memphis R. R., Kansas City, Mo.
- GOODWIN, H. STANLEY.....General Eastern Superintendent Lehigh Val-
ley R. R., South Bethlehem, Pa.
- GRIMSHAW, J. WALTER.....Australian Club, Bent st., Sydney, N. S. W.,
Australia.
- HARLOWE, CHARLES.....1417 Sixth st., S. E. Minneapolis, Minn.
- HARROD, BENJAMIN M.....City Engineer, City Hall, Room 19, New Or-
leans, La.
- HAYES, R. SOMERS.....32 Nassau st. (Residence, 39 West Thirty-eighth
st.), New York City.
- HOUSE, BRUCE F.....Assistant Engineer San Antonio and Arkansas
Pass. Ry., Fredericksburg, Texas.
- HUDSON, JOHN R.....Pomona, Los Angeles Co., Cal.
- JENKINS, WILLIAM D.....Consulting and Civil Engineer (Waddell and
Jenkins), Keith and Perry Bldg., Kansas
City, Mo.
- JENNINGS, WILLIAM H.....180 Washington ave., Columbus, Ohio.
- KEEFER, GEORGE A.....Victoria, B. C.
- KINGMAN, LEWIS.....City Engineer, Topeka, Kansas.
- KIERSTED, W.....Chief Engineer The Central Water Works Con-
struction Co., 509 Baird Bldg., Kansas City,
Mo.
- KINSLEY, THOMAS P.....421 Warren st., Syracuse, N. Y.
- KNIGHT, WILLIAM B.....Civil Engineer, Kansas City, Mo.
- LATHAM, HARRY H.....Consulting Engineer and Manufacturer of Ma-
chinery, 304 & 306 Dearborn st., Chi-
cago, Ill.
- LE CONTE, LOUIS J.....Assistant U. S. Engineer in charge Oakland
Harbor Works, P. O. Box 358, Oakland,
Cal.
- LEWIS, EVERETT W.....Fertile, Minn.
- LONG, THOMAS J.....(Care Union Bridge Co.), 1 Broadway, New
York City.
- LUCAS, D. JONES.....(Care Am. Soc. C. E.), 127 East Twenty-third
st., New York City.

- MAIS, HENRY C.....Consulting Engineer, 61 Queen st., Melbourne,
Victoria, Australia.
- MAN, ALBON P., JR.....General Manager and Acting Chief Engineer
Silver Springs, Ocala and Gulf R. R., Ocala,
Fla.
- MAY, WILLIAM A.....Superintendent Hillside Coal and Iron Co.,
Drawer U, Scranton, Pa.
- McCOOL, DANIEL.....General Manager California Southern R. R.
and California Central Ry., Los Angeles,
Cal.
- MERSEREAU, CHARLES V.....Assistant Engineer St. Louis Water Works
Extension, St. Louis, Mo.
- MILLER, J. IMBRIE.....3928 Walnut st., Philadelphia, Pa.
- MOORE, CHARLES E.....Civil Engineer, Santa Clara, Cal.
- NOBLE, ALFRED.....Memphis, Tenn.
- POST, JAMES C.....Maj. Corps Engineers, U. S. A. (care U. S. Le-
gation), London, England.
- PRENDERGAST, FRANCIS E.....Resident Engineer St. Mary's Falls Water
Power Co., Sault Ste. Marie, Mich.
- PURDON, CHARLES D.....Resident Engineer Cumberland Valley Branch
L. and N. R. R., Pineville, Ky.
- RAFTER, GEORGE W.....Civil and Sanitary Engineer, 32 City Hall,
Rochester, N. Y.
- RAY, NATHANIEL C.....(Ray & Moulthrop), Butte, Montana.
- RICHARDSON, THOMAS F.....Locating Engineer Manitou and Pike's Peak R.
R., Manitou, Colo.
- RICKON, FREDERICK J. H.....City Engineer, Little Rock, Ark.
- ROBERTS, PERCIVAL, JR.....261 South Fourth st., Philadelphia, Pa.
- SAUNDERS, WILLIAM L.....Secretary and Engineer, Ingersoll-Sergeant
Rock Drill Co., 10 Park Place, New York
City.
- SCHAEFFER, JOHN S.....Civil Engineer, 191 Littleton ave., Newark,
N. J.
- SCHMIDT, MAX O. E.....(Care Am. Soc. C. E.), 127 East Twenty-third
st., New York City.
- SCHNEIDER, CHARLES C.....Chief Engineer Pencoyd Bridge and Construc-
tion Co., 261 South Fourth st., Philadel-
phia, Pa.
- SCOVILL, E. TRACY.....22 Walnut st., Cleveland, Ohio.
- SIMPSON, GEORGE F.....(Care Am. Soc. C. E.), 127 East Twenty-third
st., New York City.
- SKILTON, GEORGE S.....68 Columbia Heights, Brooklyn, N. Y.
- SPOULE, WILLIAM J.....Principal Assistant Engineer Harbor Trust,
Montreal, Canada.
- STROBEL, CHARLES L.....Consulting Engineer, Keystone Bridge Co.,
205 La Salle st., Chicago, Ill.
- VANCE, HART.....Civil Engineer, Middleport, Ohio.
- VARONA, IGNACIO M. DE.....163 East Sixtieth st., New York City.

- WADDELL, JOHN A. L. Consulting Bridge Engineer, Keith and Perry Building, cor. Ninth and Walnut sts., Kansas City, Mo.
- WALLACE, JOHN F. (Care E. L. Corthell), 205 La Salle st., Chicago, Ill.
- WEISKOPF, SAMUEL C. Room 314, Penn Building, Pittsburgh, Pa.
- WENTWORTH, CHARLES C. Engineer and Manager American Bridge and Iron Co., Roanoke, Va.
- WHITCOMB, HENRY D. Consulting Engineer, Chesapeake and Ohio Ry., Richmond, Va.
- WIGHTMAN, WILLARD H. Ashland, Oregon.
- WILDER, FRANCIS M. Assistant to President U. S. Rolling Stock Co., Hegewisch, Ill.
- WIMMER, SEBASTIEN. Civil Engineer, St. Mary's, Elk Co., Pa.
- WISNER, GEORGE Y. Resident Engineer Brazos River Channel and Dock Co., Velasco, Texas.

ASSOCIATES.

- GIBSON, WILLIAM, JR. Publisher *The Engineering and Building Record*, 277 Pearl st. (P. O. Box 3037), New York City.
- NICOL, THOMAS W. Chief Engineer Mobile, Jackson and Kansas City R. R., 36 St. Francis st., Mobile, Ala.
- PRATT, ROBERT J. Electrical Engineer, Residence Greenbush, N. Y.
- PUTNAM, JOSEPH W. 34 St. Charles st. (Drawer 253), New Orleans, La.
- STONE, WATERMAN. General Manager Inter-State Consolidated Rapid Transit Ry., Kansas City, Kans.
- YOUNG, FREDERICK S. Assistant to President of, and the Secretary, Gilbert Car Mfg. Co., Troy Club, Troy, N. Y.

JUNIORS.

- ALLEN, THOMAS W. 161 East Thirty-fourth st., New York City.
- BAIER, JULIUS. Assistant Engineer Merchants' Terminal Ry., 52 Laclede Building, St. Louis, Mo.
- BAINBRIDGE, FRANCIS H. Assistant Engineer Edge Moor Bridge Works, Wilmington, Del.
- BENSEL, JOHN A. Assistant Supervisor Division A, Pennsylvania R. R., Jersey City, N. J.
- BISSELL, FRANK E. Chief Engineer and Acting Superintendent Denver, Texas and Fort Worth R. R., Room 75, Railroad Building, Denver, Colo.
- BLANC, FREDERICK N. 53 Cedar st., New York City.
- BRERETON, THOMAS J. Supervisor Tyrone Division Pennsylvania R. R., Osceola, Pa.
- CARRÈRE, J. MAXWELL. (Care Carrère and Haas Iron Works), 36 Park Place, New York City.
- CARROLL, EUGENE. Resident Engineer Light, Heat and Water Co., Jackson, Miss.

May, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MAY 1ST, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair; John Bogart, Secretary. Ballots for membership were canvassed and the following persons were declared elected. As members: Charles Jarvis Bates, New York City; Cornelius Conway Felton Bent, Cincinnati, O.; Charles Titus Church, Saratoga Springs, N. Y.; Charles Samuel Churchill, Roanoke, Va.; Harry Frazier, Hopkinsville, Ky.; George Porter Hilton, Albany, N. Y.; Howard George Kelley, Texarkana, Tex.; Frank Oscar Maxson, Washington, D. C.; George Nathan Merrill, Stanfordville, N. Y.; Andrew Wendelbo Münster, St. Paul, Minn.; Joseph Ramsey, Jr., Cincinnati, O.; James Eager Willard, West Point, Ky. As Associate: William Latham Abbott, Pittsburgh, Pa. As Juniors: John Nelson Hayward Cornell, New York City; Will Edwin Crane, Pittsburgh, Pa.; Alfred Burnham Ellsworth, Pittsburgh, Pa.; Oscar Erlandsen, Poughkeepsie, N. Y.; William Lindsay Ferguson, Philadelphia, Pa.

The Secretary announced the death on April 17th, 1889, of Charles C. Smith, M. Am. Soc. C. E.

Mr. J. J. R. Croes, M. Am. Soc. C. E., introduced a minute, which, on motion, was ordered spread upon the minutes of the Society; it is as follows:

In the commemoration of the assumption of office by the first President of the United States, one hundred years ago, the American Society of Civil Engineers may properly take part and pay a tribute to the memory of Washington.

Before he became a soldier, long before he entered on his career as a statesman, his inclination led him in the direction of engineering. We are told by his biographers that he was of a mathematical turn of mind, and that his first public occupation was that of a surveyor.

At that early period, before great public works had been or could be undertaken, division and development of land was the principal field of engineering, and was the essential preliminary to that knowledge of the resources of the country and of the needs for their development which must precede the formulating and carrying out of any works in which the skill of the constructing engineer is brought into play.

Into this field Washington entered, and not only made extensive surveys, but also designed and executed some works which are still extant for the improvement of the channels of Virginia rivers.

He might have turned his attention to the chief occupation of the gentlemen of his day and neighborhood, the cultivation of his farms; but he preferred the broader field of promoting the extension of the areas of farming land, and the means of transporting its products to a market. He might have taken up the practice of one of the so-called learned professions, law or theology, but he was content to obey the law and the Gospel as they stood, neither perverting the one nor controverting the other.

We may well imagine that if he had pursued the course which he began, he would have become eminent as a civil engineer; for he displayed in his career the characteristics which go to make up the highest grade of that profession, breadth of view, careful attention to detail, caution in examination, firmness in decision, vigor in action.

During his official life, he was careful to intrust work requiring engineering skill to educated and experienced engineers. He secured the services of Major L'Enfant of the French army as his chief of engineers, and to him was later intrusted the laying out of the City of Washington.

In the promotion of great enterprises for the improvement of the country, the talents and characteristics which Washington possessed would have been of the greatest value. That he was called off from such a field by the necessities of war, and later by the unanimous recognition by the people of his fitness for managing affairs of state, does not lessen our obligation to recognize him as one of the earliest members of our profession in this country.

It should inspire us to emulate his example, and to endeavor to make ourselves worthy of the wonderfully beautiful and apt characterization of him by the poet Whittier—

“The one man equal to his trust—
Wiser than lore, and without weakness good,
Calm in the strength of unflawed rectitude.”

Vice-President Fteley stated that in connection with the celebration of the Centennial Inauguration of George Washington as President of the United States, it was his pleasant duty, in the absence of the President of the Society, to sign the address presented to the President of the United States, in behalf of the civic, commercial, industrial and scientific organizations represented in the celebration. The address was then read, and, on motion, was ordered spread upon the minutes of the Society. It is as follows:

TO BENJAMIN HARRISON,

APRIL 30th, 1889.

President of the United States:

The undersigned, representatives of the civic, commercial, industrial and educational organizations and bodies of the City of New York, on the occasion of this centennial celebration of the inauguration of Washington, the first President, present anew to the President of the United States, in his official capacity, their allegiance to the Government, Constitution and the laws, with their congratulation upon the completion of a century of constitutional government and the progress made in that century.

A paper by George W. Rafter, M. Am. Soc. C. E., on the "Fresh Water Algæ and their Relation to the Purity of Public Water Supplies," was read by the author and illustrated by the microscope.

The subject was discussed by Messrs. Brush, Worthen, Collingwood and Professor Leeds.

MAY 15TH, 1889.—The Society met at 20 o'clock; William E. Worthen, Past President, in the chair; John Bogart, Secretary.

The Secretary announced the death on May 4th, 1889, of Major A. B. Rogers, M. Am. Soc. C. E.

The paper on "Fresh Water Algæ and their Relation to the Purity of Public Water Supplies," by G. W. Rafter, M. Am. Soc. C. E., which was read at the last meeting, was discussed by Messrs. Kuichling, Fteley, Brush, Worthen, Croes, Professors Waller and Leeds.

OF THE BOARD OF DIRECTION.

APRIL 4TH, 1889.—Applications were considered. General business transacted.

MAY 2D, 1889.—Applications were considered. A committee to determine details as to the convention was appointed. A communication from the Committee on Uniform Standard Time was considered. Appropriations made.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

Date of Election.

BATES, CHARLES JARVIS.....	Civil Engineer, 63 Broadway (P. O. Box 2702), New York City	May 1, 1889
BENT, CORNELIUS CONWAY FELTON	Superintendent Ohio and Mississippi River Ry., Cincinnati, Ohio.....	May 1, 1889
CHURCH, CHARLES TITUS.....	Saratoga Springs, N. Y.....	May 1, 1889
CHURCHILL, CHARLES SAMUEL..	Engineer Maintenance of Way Norfolk and Western R. R., Roanoke, Va.....	May 1, 1889
FRAZIER, HARRY.....	Superintendent Maintenance of Way Chesapeake and Ohio Ry., Cincinnati, Ohio.....	May 1, 1889
HILTON, GEORGE PORTER	Engineer Hilton Bridge Construction Co., Albany, N. Y..	May 1, 1889

MAY PROCEEDINGS.

KELLEY, HOWARD GEORGE.....	Resident Engineer Maintenance of Way, St. Louis, Arkansas and Texas Ry., Texarkana, Texas.....	May 1, 1889
MAXSON, FRANK OSCAR.....	Civil Engineer United States Navy, 647 East Capitol st., Washington, D. C.....	May 1, 1889
MERRILL, GEORGE NATHAN.....	Resident Engineer Poughkeepsie and Connecticut R. R., 143 Catherine st., Springfield, Mass.....	May 1, 1889
MÜNSTER, ANDREW WENDELBO..	City Engineer's Office, St. Paul, Minn.....	May 1, 1889
OWENS, HENRY KINDER	(Scurry & Owens), Seattle, Wash.	Mar. 6, 1889

ASSOCIATE.

ABBOTT, WILLIAM LATHAM.....	Carnegie, Phipps & Co., Pittsburgh, Pa.....	May 1, 1889
-----------------------------	---------------------------------------------	-------------

JUNIORS.

CRANE, WILL EDWIN.....	Inspector Lassig Bridge and Iron Works, Pittsburgh, Pa..	May 1, 1889
ELLSWORTH, ALFRED BURNHAM..	(Care Pittsburgh Testing Laboratory), Pittsburgh, Pa....	May 1, 1889
ERLANDSEN, OSCAR.....	Pennsylvania, Poughkeepsie & Boston R. R., Portland, Pa..	May 1, 1889
FERGUSON, WILLIAM LINDSAY...	1632 N. Fifteenth st., Philadelphia, Pa.....	May 1, 1889

CHANGES AND CORRECTIONS.

HONORARY MEMBER.

NEWTON, JOHN.....	President Panama R. R., Mills Building, New York City.
-------------------	--------------------------------------------------------

MEMBERS.

BUTTERFIELD, FRANCIS E.....	Hotel Hidalgo, Monterey, Mexico.
CRAVEN, HENRY S.....	Civil Engineer U. S. N., Navy Yard, N. Y.
DAVIS, FRANK P.....	Resident Engineer Nicaragua Canal Construction Co., Greytown, Nicaragua.
EABLEY, JOHN E.....	Engineer for Bowes Scott, Read, Campbell & Co., Mexico; address, Irapuato, Guanajuato, Mexico.

- FARNHAM, ROSCOE E.....228 La Salle st., Room 53, Chicago, Ill.
- HIDER, ARTHURU. S. Assistant Engineer, Engineer in charge
Improvements, Lake Providence Reach,
Miss., Wilsons Point, La.
- KILLEBREW, SAMUEL.....Brownsville, Tenn.
- LOCKE, CHARLES A.....Assistant Engineer, Nashville, Tenn.
- MCCLURE, WILBUR F.....Chief Engineer Los Angeles, Pasadena and
Glendale Ry.; U. S. Deputy Mineral Sur-
veyor, Garvanza, Cal.
- McKEE, CHARLES HAssistant Engineer New York Central and
Hudson River R. R., Buffalo, N. Y.
- McKEE, SAMUEL B.....Assistant Engineer Ontario, Carbondale and
Scranton Ry., Hancock, N. Y.
- MOULTON, MACE.....Consulting Engineer Berlin Iron Bridge Co.,
East Berlin, Conn.
- NELSON, GEORGE T.....Civil and Consulting Engineer, Room 16,
Chamber of Commerce, Omaha, Neb.
- O'ROURKE, JOHN FEngineer for Dawson, Symmes & Ussher, Con-
tractors Chignecto Marine Transport Ry.,
Amherst, Nova Scotia.
- OSBORN, FRANK CEngineer King Iron Bridge and Manufactur-
ing Co., Cleveland, Ohio.
- PETERSON, P. ALEX.....Consulting Engineer Canadian Pacific Ry.,
Montreal, Canada.
- PRINCE, EDWARD.....Quincy, Ill.
- RUTHERFORD, FRANCIS M.....Assistant Engineer Richmond and Danville
R. R., Richmond, Va.
- SANDERSON, J. GARDNER.....Rondout, N. Y.
- SHANLY, JAMES M.....40 St. Mark st., Montreal, Canada.
- SKINNER, FRANK W.....Editorial Staff *Engineering and Building Record*,
277 Pearl st., New York City.
- STEPHENS, CLINTON F.....1230 Washington ave., St. Louis, Mo.
- STOREY, WILLIAM B., JR.....Corner Fourth and Townsend sts., San Fran-
cisco, Cal.
- THOMSON, JOHN.....Manufacturer of Printing and Embossing
Presses and Water Meters, 11-13 Temple
Court, New York City.
- WILSON, ARTHUR OWEN.....Secretary, Treasurer and General Manager The
Huntsville Belt Line and Monte Sano Ry.,
Huntsville, Ala.
- WROTNOWSKI, ARTHUR F.....Engineer in charge Harbor Works, Tampico,
Mexico.

JUNIOR.

- KOYAYASHI, KAYAJIRO.....Sanitary Engineer to Sanitary Bureau, Home
Dept., Tokio, Japan.

DEATHS.

- ANDERSON, ADNA.....Elected Member September 2, 1874; died May 15, 1889.
- BENTLEY, HENRY A.....Elected Member March 2, 1881; died May 13, 1889.
- MARSHALL, CHARLES A.....Elected Member October 1, 1884; died May 31, 1889.
- ROGERS, ALBERT B.....Elected Member June 6, 1883; died May 4, 1889.

June, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JUNE 5TH, 1889.—The Society met at 20 o'clock, Vice-President Fteley in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As members: Martin Gay, West New Brighton, N. Y.; Julien Astin Hall, Washington, D. C.; Frank Nearing, Tarrytown, N. Y.; George Spencer Pier-son, Kalamazoo, Mich.; Arthur Burr Starr, Allegheny, Pa. As Associates: Jules Breuchaud, New York City; Kiosaburo Futami, Kansas City, Mo.; John Vose Hazen, Hanover, N. H.; Millard Hunsiker, Pittsburgh, Pa.; Frank Clifford Lewis, Mount Vernon, O. As Juniors: William Channing Cushing, Zanesville, O.; Thomas Francis Lawlor, Poughkeepsie, N. Y.; Merritt Haviland Smith, Jr., New York City.

The Secretary announced the death, on May 15th, 1889, of General Adna Anderson, M. Am. Soc. C. E.; and the death on May 31st, 1889, of Mr. Charles A. Marshall. M. Am. Soc. C. E.

Mr. William P. Shinn, Director Am. Soc. C. E., gave some account of the recent disaster at Johnstown, Pa., and the subject was discussed by Messrs. Flagg, Brendlinger, North, John Bogart, Croes, Skinner, Fteley, A. H. Simpson, George S. Rice and W. P. Shinn.

On motion, the following committee was appointed to visit the scene of the disaster and report to the Society the cause of the calamity: M. J. Becker, President Am. Soc. C. E.; James B. Francis, Past President Am. Soc. C. E.; William E. Worthen, Past President Am. Soc. C. E.; and A. Fteley, Vice-President Am. Soc. C. E.

ANNUAL CONVENTION OF THE SOCIETY, HELD AT SEABRIGHT, N. J., JUNE 20TH-26TH, 1889.

FIRST SESSION, THURSDAY, JUNE 20TH, EVENING.—The Convention was called to order by the President of the Society, Mr. M. J. Becker.

The CHAIR.—The Secretary will please read the provisions of the By-Laws covering the Annual Convention.

The SECRETARY (read from Sec. 1 of the By-Laws).

I am requested to say, Mr. President, that it has been the custom to have the Chairman of the Convention nominated by the Local Committee.

CHARLES MACDONALD, M. Am. Soc. C. E.—Mr. President, in behalf of the members of the Local Committee, I have the honor and very great pleasure of welcoming you to Seabright. The local attractions of this part of the country are not very numerous; at the same time we hope that the Convention of 1889 may be a useful one and may be remembered with pleasure by those who are present.

In order that we may organize properly, under the rules of our Society, I take great pleasure in presenting the name of one whom I am sure you will all recognize as quite entitled to the honor of presiding over this body as Chairman. I wish to propose the name of Mr. J. J. R. Croes, who for ten years served as Treasurer of the Society, and who rendered very efficient and faithful service in that and in his other official relations to the Society, and whom I think we may honor on this occasion very appropriately as Chairman of the Convention.

The CHAIR.—It is moved and seconded that Mr. J. J. R. Croes preside over this Convention. (Mr. Croes was unanimously elected Chairman.)

At the request of the President, the past Presidents present, Mr. William J. McAlpine, Colonel Julius W. Adams, Messrs. James B. Francis, Frederick Graff and William E. Worthen, took positions upon the platform.

Mr. J. J. R. CROES (taking the chair).—Mr. President, ladies and gentlemen, I have to thank you for the high honor conferred upon me in calling me to preside over this Convention, and on behalf of the resident membership, I welcome the members from all parts of the country to New York. It is not often that that honor and pleasure is given to the members residing in New York, as for our Annual Conventions we have traveled all over all parts of the country, from Maine—not quite to California, although we some day hope to reach that point—from the North to the South, only occasionally meeting for professional improvement and social intercourse in New York City. The Annual Meetings are

held in New York, but this is an entirely different occasion and no business is supposed to interfere with our pleasure.

In seeking for a place in which to hold the Convention in New York, the Committee, very wisely, I think, chose to come away from the bustle and distractions of a great city, where so many engineering works of interest are concentrated that they are likely to distract the attention of the members, and no better place could have been chosen than this, where, in the intervals of professional discussion, we can sit and look out upon the ocean, and possibly hear the faint echo of the greeting which our fellow members are receiving on the other side, and when we are tired of listening to the "multitudinous voice" of the waves we can devote ourselves to the problems which the committee have laid before us. There will be discussion on the question of the methods of transportation across streams, touching upon points in which foreign engineering features differ from American engineering methods. Then will follow discussions regarding water, treating first its most beneficent aspect as furnishing comfort and convenience by a public water supply, and then its terrible force and destructive power as an agent of harm, as exemplified in the Johnstown disaster. The methods of transportation by canals and by highways will follow, and last on the list, but not least important, are the discussions and papers regarding the great railway systems of the country, in which more engineers are engaged and more capital invested than in any other branch of public improvement. The discussions appear, according to the title of the papers, to lead in the right direction in one respect. The problem in the first part of this century has been to do the most work with the least amount of money; now the time has come when the wisest investment of the money is to be considered, by developing and strengthening and improving the railways in their tracks and in their rolling stock.

With these various attractions, without and within, I have to announce that the Convention is opened and the first order of business will be called for.

The SECRETARY.—Mr. President, I am requested to say that the committee in charge of arrangements of the papers and progress of their discussion announce that the printed preliminary programme, copies of which can be obtained in the Committee room, will be the programme of the meeting, unless the development of the discussions renders it desirable for the Committee at any time to make some changes, which will be duly announced.

I have just received, since coming to Seabright to-day, the following cable:

To BOGART, *Secretary American Society of Civil Engineers.*

American party left Dover at noon to-day. All well.

FORREST,

Secretary Institution of Civil Engineers.

Mr. CHARLES B. BRUSH.—Mr. Chairman, we have all read with pleasure of the courtesies which have been extended to the party of American engineers now in Europe, and I move that this telegram be cabled to the Institution of Civil Engineers:

To the Institution of Civil Engineers, London, England:

The American Society of Civil Engineers, in annual convention assembled, desires to express its hearty appreciation of the courtesies extended to its members by your Institution and the English people generally.

JOHN BOGART,
Secretary.

(Carried.)

NOTE.—Since the adjournment of the Convention the following letter has been received from Mr. James Forrest, Secretary of The Institution of Civil Engineers, London, England:

Your gratifying telegram of Saturday's date has been duly received. I can assure you that all the members of this Institution and its officers have only been delighted to show their respect, esteem and regard for their American brethren.

Sincerely do we all trust that there may be other occasions of showing attention to American engineers, personally and collectively.

I am

Yours faithfully,
JAMES FORREST,
Secretary Institution of Civil Engineers.

SECOND SESSION, Friday, June 21st, Morning.—The session opened at 10 o'clock, Chairman J. James R. Croes presiding.

A paper on "American Railroad Bridges," by Theodore Cooper, M. Am. Soc. C. E., was read by the author, and discussed by Messrs. O. E. Michaelis, Seaman, J. E. Watkins, P. C. Ricketts, G. H. Thomson, T. Guilford Smith, William E. Hoyt and Theodore Cooper.

A discussion on "Timber Trestle Bridges," by C. Palmer, M. Am. Soc. C. E., was read by the Secretary.

A paper on "A Componential Truss for Traveling Cranes," by H. B. Seaman, M. Am. Soc. C. E., was read by the author.

THIRD SESSION, June 21st, Afternoon.—The session was resumed at 14.30 o'clock. The paper on "A Componential Truss for Traveling Cranes" was discussed by Messrs. Collingwood and Seaman.

A paper on the "Sibley Bridge," by O. Chanute, M. Am. Soc. C. E., W. H. Breithaupt, M. Am. Soc. C. E., and J. F. Wallace, M. Am. Soc. C. E., was read by the Secretary.

A paper on "Lime Sulphite Fiber Manufacture in the United States," by O. E. Michaelis, M. Am. Soc. C. E., with some remarks on the Chemistry of the Process, by Martin L. Griffin, M.A., was read by Major Michaelis and discussed by Mr. Collingwood.

A paper on "The Development of the American Rail and Track," by J. E. Watkins, Assoc. Am. Soc. C. E., was read by the author.

FOURTH SESSION, June 21st, Evening.—The session was resumed Friday evening, June 21st. The President of the Society, Mr. Max J. Becker, delivered the Annual Address.

FIFTH SESSION, Saturday, June 22d, Morning.—The session of the Convention was resumed at 10 o'clock, Chairman J. J. R. Croes presiding.

A paper by George W. Rafter, M. Am. Soc. C. E., on "Fresh Water Algae and their Relation to the Purity of Public Water Supplies," was presented by the author, and discussed by Messrs. Croes, Worthen, Francis, F. P. Stearns, Graff, Fteley, Brush, Whinery and S. L. Cooper.

By request, Mr. P. F. Brendlinger, M. Am. Soc. C. E., exhibited a photograph showing the process of injecting grout into the interstices of backing masonry in the New Croton Aqueduct, and explained the details of the process.

SIXTH SESSION, June 22d, Afternoon.—The session was resumed Saturday afternoon. Mr. A. Fteley, Vice-President Am. Soc. C. E., as acting Secretary of the committee appointed to visit the South Fork Dam, and to report to the Society the cause of its failure, presented a report of progress.

The subject was discussed by Messrs J. Foster Flagg, Collingwood, McAlpine, Macdonald, Becker, Brendlinger, John Bogart, James B. Francis, T. Spencer Miller, Fteley and Crowell.

Past President William J. McAlpine, Hon. M. Am. Soc. C. E., presented a paper on the "Construction of Dams." The subject was discussed by Messrs. Fteley, James B. Francis, Fergusson, Brendlinger, Croes, Becker and T. G. Smith.

A paper by Desmond Fitz Gerald, M. Am. Soc. C. E., on "Maximum Rates of Rainfall," was read by the Secretary.

SEVENTH SESSION, Monday, June 24th.—The session of the Convention was resumed at 14 o'clock, Chairman Croes presiding.

The CHAIR.—The first business is the appointment of a Nominating Committee. Under the provisions of the By-Laws, "At the Annual Convention a Nominating Committee of five members, not officers of the Society, shall be appointed by the Convention. This committee shall present to the Board of Direction, on or before the first day of November ensuing, the names of the persons selected by them as candidates for officers."

This committee is to select the names of candidates for officers for the ensuing year, and report later.

It has been customary to nominate these five members from certain geographical districts. These districts were changed last year. As then arranged they were: No. 1. Resident members, New York City and fifty miles around; No. 2. The rest of New York, New England and Canada; No. 3. Pennsylvania and the South Atlantic States; No. 4. The Southern States, with Missouri, Kansas, Colorado and the Pacific slope; No. 5. The Ohio River States and the Northwest.

It is customary to take a recess for five minutes, in order that the members from these several districts may present the name of some candidate. What is the pleasure of the Convention?

Major O. E. MICHAELIS.—I move that we proceed with the order of business.

Mr. H. B. SEAMAN.—That includes the distribution the same as last year?

The CHAIR.—Yes, sir.

Mr. SEAMAN.—I second the motion.

The CHAIR.—The members present from these several districts will now please meet together and select nominations for members of the Nominating Committee.

Mr. WILLIAM P. SHINN.—Mr. Chairman, on behalf of the resident members, I am instructed to say that they have unanimously elected Mr. Stevenson Towle to represent their district.

The CHAIR.—The second district, the rest of New York, New England and Canada.

Mr. JAMES B. FRANCIS.—Have voted to nominate Major O. E. Michaelis.

The CHAIR.—The third district, Pennsylvania and the South Atlantic States.

Mr. M. J. BECKER.—That district has nominated Mr. F. H. Smith, of Baltimore.

The CHAIR.—The fourth district, the Southern States, with Missouri, Kansas and Colorado and the Pacific slope.

The SECRETARY.—Mr. President, I am instructed to say that one gentleman only is now here representing that district, and that quite a number of members have met together, and have suggested that this gentleman be the member of the Nominating Committee representing this district; that is Mr. Arthur Macy.

The CHAIR.—The fifth district, the Ohio River States and the Northwest.

Mr. A. N. TALBOT.—That district nominates Mr. J. F. Wallace, of Chicago.

The CHAIR.—The following nominations for members of the Nominating Committee have been made:

Stevenson Towle, Major Michaelis, F. H. Smith, Arthur Macy and J. F. Wallace.

Mr. CHARLES B. BRUSH.—I move that these nominations be adopted as the choice of the Convention. (Vote put; carried.)

The CHAIR (Mr. Croes).—If there is no objection, the business meeting to be held during the Convention will be resumed, the Convention taking a recess until the conclusion of the business meeting, which is resumed after a recess.

EIGHTH SESSION, Tuesday, June 25th, Morning.—The session was resumed at 10 o'clock, Mr. M. Cohen in the chair.

A paper on the "Effect, of a Rapidly Increasing Supply of Water to a Stream, on the Flow Below the Point of Supply," by James B. Francis, Past President Am. Soc. C. E., was read by the author, and discussed by Messrs. Merriman, Eliot C. Clarke and James B. Francis.

The report of the Committee on the "Proper Relation to Each Other of the Sections of Railway Wheels and Rails" was then read.

A paper on "Cylindrical Wheels and Flat-Topped Rails for Railways," by D. J. Whittemore, Past President Am. Soc. C. E., was read by the Secretary. Written discussions by Messrs. Wilder, C. F. Allen, Burpee, Becker, J. D. Hawks, Blackwell, Waterman Stone, Pontzen, Le Rond, Buck, J. B. Johnson, Gottlieb, J. M. Goodwin, Wilson Crosby, E. T. D. Myers, W. Howard White, J. B. Francis, Crowell, Bouscaren, George Gibbs, Strobel, Bates, R. W. Hunt, Landreth, F. W. Webb, Collingwood, George S. Morison and C. P. Sandberg were read, and the subject was discussed by Messrs. Merriman and Fergusson.

A paper on "Punched and Reamed Steel" by Percival Roberts, Jr., M. Am. Soc. C. E., was read by the Secretary and discussed by Messrs. Skinner, Seaman, Merriman and Dagron.

The paper by Theodore Cooper, M. Am. Soc. C. E., on American Railroad Bridges, previously read, was discussed by Messrs. Flagg, Seaman and G. H. Thomson.

A communication from Professor O. H. Landreth on the subject of desirable methods for securing attention to improvement of highways was read. After discussion it was concluded that the subject was one belonging properly to the several States.

A paper on "The Influence of Temperature During Setting on the Tensile Strength of Cement Mortars, and on the Influence of Repeated Mixings on the Tensile Strength of Cement Mortars," by O. H. Landreth, M. Am. Soc. C. E., was read by the Secretary, and discussed by Messrs. Flagg, Seaman, Bogart, and Eliot C. Clarke.

NINTH SESSION, June 25th, Afternoon.—The session was resumed at 14.30 o'clock, Mr. M. Cohen in the chair.

A paper on "The Improvement of Railway and Street Railway

Track," by E. E. Russell Tratman, Jun. Am. Soc. C. E., was read by the author, and discussed by Messrs. Flagg, Seaman, Voorhees, Thomson, Bryson and Cohen.

A paper on "Metal Track for Railways," by E. E. Russell Tratman, Jun. Am. Soc. C. E., was read by the author.

A paper on the "Settling and Filtration Basins of the Vicksburg Water Works," by Clarence Delafield, M. Am. Soc. C. E., was read by the Secretary and discussed by Mr. Flagg.

TENTH SESSION, June 25th, Evening.—The session was resumed at 20 o'clock, Chairman Croes presiding.

A paper on "Flood Heights in the Mississippi River, with Especial Reference to the Reach between Helena and Vicksburg," by William Starling, M. Am. Soc. C. E., was read.

The subject of the Improvement of Sedimentary Rivers was discussed by Mr. George H. Henshaw.

A paper on "Ship Canals in 1889," by R. E. Peary, M. Am. Soc. C. E., was read by the Secretary.

A paper on "Railways of Mexico," by W. Barclay Parsons, M. Am. Soc. C. E., was read by the author.

On motion of Mr. A. Fteley, the thanks of the Society were tendered to Mr. J. James R. Croes, the Chairman of the Convention.

On motion of Mr. M. Cohen, the thanks of the Society were tendered to the members of the Committee of Arrangements, Messrs. Charles Macdonald, T. C. Clarke and Stevenson Towle.

On motion of Mr. J. G. Dagron, the thanks of the Society were tendered to the Seabright Lawn Tennis and Cricket Club for their courtesy in extending the privileges of their club house and grounds to the Members of the Society during the Convention.

On motion of Mr. P. F. Brendlinger, the thanks of the Society were tendered to Mr. G. B. Sandt, the proprietor of The Octagon House, Seabright, at which the Convention was held.

The Convention then adjourned.

The following 134 members were in attendance at the Convention:

Julius L. Adams, Julius W. Adams, Brooklyn, N. Y.; Charles Ackenheim, Elizabeth, N. J.; W. H. Atwood, Cleveland, Ohio; Thomas W. Baldwin, Bangor, Me.; H. Bissell, Boston, Mass.; John W. Bacon, Danbury, Conn.; Peter F. Brendlinger, Tarrytown, Charles J. Bates, John Bogart, Alfred P. Boller, Alex. G. Brinckerhoff, H. Waller Brinckerhoff, Charles B. Brush, Andrew Bryson, C. W. Buchholz, New York City, Fred. H. Baldwin, Greenpoint, N. Y.; John A. Bense, Jersey City, Charles P. Bonnett, Elizabeth, N. J.; Max J. Becker, Pittsburgh, Pa.; Charles R. Boyd, Wytheville, Va.; Eliot C. Clarke, Boston, Mass.; Samuel H. Chittenden, East River, Conn.; Alfred Craven,

Dobbs Ferry, Samuel L. Cooper, Yonkers, Alfred G. Compton, Theodore Cooper, J. James R. Croes, New York City, N. Y.; Francis Collingwood, Elizabeth, N. J.; Charles T. Church, Saratoga Springs, J. Foster Crowell, Geneva, William B. Cogswell, Syracuse, N. Y.; Mendes Cohen, Baltimore, Md.; James G. Dagron, George Devin, S. L. F. Deyo, New York City, Clarence Delafield, New Brighton, N. Y.; Charles Davis, Pittsburgh, Pa.; Benjamin Douglas, Detroit, Mich.; Oscar Erlandsen, Portland, Pa.; Robert L. Engle, Cincinnati, Ohio; James B. Francis, Lowell, Mass.; Alphonse Fteley, New York City, Mark Fargusson, J. Foster Flagg, Brooklyn, Bryant Godwin, George S. Greene, Jr., New York City, Charles S. Gowen, Sing Sing, N. Y.; Frederick Graff, Philadelphia, Pa.; Edward B. Guthrie, Buffalo, N. Y.; R. L. Hoxie, Willets Point, Stephen S. Haight, Robert L. Harris, William J. Haskins, Rudolph Hering, John Houston, Charles W. Hunt, William R. Hutton, New York City, N. Y.; George W. Howell, Morristown, C. E. Hewitt, Trenton, N. J.; William E. Hoyt, Rochester, N. Y.; E. A. Hermann, Indianapolis, Ind.; J. M. Jackson, Easton, Md.; William H. Jennings, Columbus, Ohio; William D. Kelley, Jr., Tarrytown, C. H. Kelsey, New York City, S. Munch Kielland, Buffalo, N. Y.; William B. Knight, Kansas City, Mo.; James F. Lewis, New York City, Frank M. Leavitt, Brooklyn, N. Y.; J. I. Livingston, Bound Brook, N. J.; Gustav Lindenthal, Pittsburgh, Pa.; O. E. Michaelis, Augusta, Me.; T. H. McKenzie, Southington, Conn.; Charles Macdonald, Arthur Macy, Henry C. Meyer, George W. McNulty, New York City, William J. McAlpine, West New Brighton, N. Y.; T. Spencer Miller, Hackensack, N. J.; Foster Morss, Red Falls, S. B. McKee, Hancock, George E. Mann, Buffalo, N. Y.; Mansfield Merriman, Bethlehem, Pa.; Henry G. Morse, Edge Moor, Del.; Arthur L. Mills, Toledo, Ohio; Ellis B. Noyes, Fort Edward, N. Y.; John F. O'Rourke, Amherst, N. S.; Frederick N. Owen, New York City; J. E. Ostrander, Albany, N. Y.; Frank C. Osborn, Cleveland, Ohio; W. Barclay Parsons, Henry G. Prout, New York City, A. B. Paine, Poughkeepsie, George W. Rafter, Rochester, Benjamin Rhodes, Niagara Falls, N. Y.; R. E. Peary, League Island, Pa.; John A. Partridge, Washington, D. C.; Charles F. Powell, St. Louis, Mo.; Joseph R. Richards, Boston, Mass.; George S. Rice, Richard P. Rothwell, New York City; William Rumble, Bayonne, N. J.; Palmer C. Ricketts, Troy, N. Y.; Frederic P. Stearns, Boston, Mass.; William P. Shinn, Frank W. Skinner, Robert I. Sloan, Charles SooySmith, D. McN. Stauffer, J. H. Striedinger, New York City, John M. Stewart, Dobbs Ferry, Merritt H. Smith, Jr., Yonkers, T. Guilford Smith, Buffalo, N. Y.; C. C. Schneider, Henry B. Seaman, Philadelphia, Pa.; Frederick H. Smith, Baltimore, Md.; Charles L. Strobel, Chicago, Ill.; George H. Thomson, Calvin Tomkins, Stevenson Towle, New York City, E. E. Russell Tratman, Brooklyn, N. Y.; A. N. Talbot, Champaign, Ill.; Jose R. Villalon, Theodore Voorhees, New York City; John

D. Van Buren, Newburgh, H. L. Van Zile, Albany, N. Y.; N. J. Welton, Waterbury, Conn.; James R. Wardlaw, William E. Worthen, New York City, Albert L. Webster, West New Brighton, N. Y.; J. Elfreth Watkins, Washington, D. C.; Samuel Whinery and Frederick C. Weir, Cincinnati, Ohio.

Fifty-four ladies of the families of members accompanied them on the occasion of this Convention.

MEETINGS OF THE SOCIETY.

JUNE 24TH, 1889.—(Business Meeting during the Convention.)—M. J. Becker, President Am. Soc. C. E., in the Chair; John Bogart, Secretary.

The report of the Special Committee on the "Proper Relation to Each Other of the Sections of Railway Wheels and Rails" was presented. This report will be published, with discussions upon it, in the Transactions. The recommendations of the Report and its concluding paragraphs are as follows:

First.—Your Committee recommends a 12-inch top radius as a standard for rail sections of all weights.

Second.—Your Committee recommends a broad head relatively to depths for sections of all weights, taking care not to go too far in either dimension, especially in very large or very small sections, or to endanger the flange cutting into the joint.

Third.—Your Committee recommends a $\frac{1}{4}$ -inch corner radius, as a standard for sections of all weights.

Fourth.—Your Committee recommends a $\frac{1}{16}$ -inch lower corner radius for the head, as a standard for sections of all weights.

Fifth.—Your Committee recommends that, starting from a sufficient base width of head to give ample bearing for the joint, or to conform to recommendation No. 1, the sides be carried up vertical, as a standard for sections of all weights.

Sixth.—Your Committee announces as final conclusions the preliminary conclusions as to the general laws of rail and wheel wear included in its Preliminary Report.

Your Committee does not deem it proper to go beyond the above recommendations and attempt to elaborate details for standard sections complete. All that is included within the scope of its instructions it has now done. Anything beyond this must be done by a committee expressly appointed to recommend standard forms of rail sections, and not merely to "consider the proper relations to each other of the sections of railway wheels and rails." But the fact that such unexpected unanimity of opinion has developed in respect to the proper form of the head of a rail section encourages the Committee to believe that a moderate amount of intelligent effort would secure the adherence of three-quarters at least of the

engineers and railway mileage of the country to a set of standard sections elaborated after due inquiry and comparison of views.

Your Committee, having discharged the duty intrusted to it, now asks to be discharged.

Respectfully submitted,

H. STANLEY GOODWIN,
A. M. WELLINGTON,
SAMUEL REA,
GEORGE S. MORISON,
THOMAS RODD,
S. M. FELTON, Jr.,
JAMES ARCHBALD,

Committee.

Mr. J. J. R. Croes moved that the report be received and the Committee discharged.

Mr. WILLIAM P. SHINN.—I move an amendment to the motion; that the motion of Mr. Croes be amended so as to read that the Committee be continued. (Seconded.)

Mr. SHINN.—I appear here under an obligation to represent a fellow member, Mr. Lindenthal, who was at the Convention during the preceding session. When I last saw him on Saturday, he asked if I would present his views on the subject of the continuance of this Committee, and the authorizing of it to recommend a set of standard rail sections. He gave me some communications which he desired me to present to the Convention, obtained by him. He states that the Cambria Company has thirty-three rail sections, ten of which are 60-pound rails, and eighteen of which are of sections above 56 and below 63 pounds in weight. The Pennsylvania Steel Company has twenty-four rail sections, five of which are 60 pounds and seven of which are above 56 and below 63 pounds. The Edgar Thompson Steel Company has thirty-two sections, of which four are 60, six are 56 and ten are above 56 and below 63 pounds. We all know how very slightly different sections are made to differ; most of us wrestle with the problem, and I do not hesitate to say that I have successfully done so myself during the last ten months and produced another rail section; but it will be a great advantage not only to the engineering profession, but to railroad companies and rail mills, if we could have a standard set of rail sections. We all recognize the fact that making and turning of rolls must be paid for out of the proceeds of the steel rails, and therefore by the railroad companies. We may shut our eyes and say we get rails at the same price whether we take a new or old section, but in point of fact if we had standard rail sections, we would get our rails somewhat cheaper. In competition we would get our rails cheaper. Then it would be another great advantage if we could have standard sections for rails for ordinary use which could be kept in stock. Now a rolling mill cannot keep rails in stock; they know that the particular section may be deviated from, and therefore be unacceptable; for that reason it seems to me that we should have a standard rail section.

As to the question of the discharge of this committee and appointing another, or continuing this committee, it seems to me that engineers as well as others should proceed on the line of the least resistance. The members of this committee have made themselves familiar with the subject; they have collected an immense amount of information. If we are going to discharge this committee and appoint the same members on a new committee, it is a mere matter of form and we simply continue the committee.

The CHAIR.—The question is on the amendment of Mr. Shinn.

Mr. CROES.—Mr. President, has any gentleman present any argument to offer against the view taken by Mr. Shinn? I want to know if there is anybody who thinks differently; if there is not, I will accept his amendment.

Mr. ELIOT C. CLARKE.—It seems to me that it would be a little better to discharge the committee and re-appoint them, because I think the committee has a right to be discharged when they ask for it. When a committee is appointed and does the thing that is intrusted to it, and asks to be discharged, I think that they have the right to be discharged; then, if they are appointed again, they doubtless will accept and go on, but I think it is a little ungracious not to allow them that privilege when they wish it. I know I have been in that position myself sometimes.

Mr. CHARLES B. BRUSH.—As I understand it, this committee think they have exhausted the powers given them under the original resolution. Now, the mere resolution to continue it seems to me does not give the committee what they want. They want instructions which will give them the power to go on. If the committee is continued, it will have to be under a resolution giving them further powers, and therefore, the question is, whether it would not be well to discharge this committee and re-appoint it under a resolution which will give them fuller powers. If the original resolution is passed, there certainly ought to be a vote of thanks, and therefore I think the amendment would be undesirable. Any resolution which Mr. Shinn would bring up to cover the ground which they consider necessary I think would be proper.

Mr. SHINN.—I did not intend to speak again on this resolution. The matter of form is immaterial. It is clearly the sense of the meeting that this committee should be intrusted with the further work to be done. The committee have not only gone to the full extent of their instructions, but they have made recommendations which were not embodied in the original instructions, and it seems to me there is no injury in giving them fuller power and in continuing the committee. The motion offered by Mr. Croes was to accept the report and discharge the committee, my amendment was to accept the report and continue the committee; if that is adopted, I should move that the committee be authorized and instructed to report a standard rail section.

The SECRETARY.—Mr. President, without desiring to interject parliamentary questions into the discussion, I beg to suggest that if this committee is discharged, then it is entirely possible that the appointment of a new committee is out of the power of this meeting, because it is provided by Section 23 of the By-Laws, that "Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: Any resolution proposing such a committee shall be referred to the Board of Direction, which shall examine the same and report to the Society a concise statement of the argument for and against the appointment of such committee, which statement shall be printed and issued to the Society with a letter-ballot; or, if the Board fails to report within one month, the letter-ballot shall be issued without comment." Now this committee upon sections of railway wheels and rails was appointed in the regular way; they have done their work with great care, and have finally made a report. In considering the relations between the sections of wheels and rails, they have really formulated a standard section of the upper portion of a railway rail, but they determined not to go farther than the Society authorized them to go. They secured the data to make a report upon the subject which was intrusted to them, and the committee now say, if the Society cares to have them continue, let it say so; at all events, here is the report.

The CHAIR.—Are you ready for the question?

Mr. M. COHEN.—It seems to me that if we simply accept the report of the committee without acting at all upon the question of their discharge, we accomplish the whole thing. If it be desirable that there should be intrusted to them the further duty of determining the form of section of rail as they may recommend it, it can be introduced here, and I suggest the proposition in this form: That the standing committee on the relation to each other of the sections of wheels and rails be asked to report upon a standard rail section. The standing committee, still in existence, will then deem it their duty so to report. I would, therefore, suggest to the mover of the last amendment that the motion be the acceptance of the report of the committee, and then it remains and is not discharged.

Mr. SHINN.—I accede.

Mr. COHEN.—If satisfactory, I make such a motion, that the report of the committee be accepted. (Accepted by Mr. Clarke, the seconder.)

The CHAIR.—Then the question is upon the amendment of Mr. Shinn to the effect that the report of the committee on rails and wheels be accepted. (Carried.)

Mr. SHINN.—I move that the committee be authorized and instructed to report to the Society a set of standard rail sections of weights beginning at 40 pounds and advancing up in increments of 5 pounds to 100 pounds per linear yard. (Seconded.)

Mr. CROES.—Mr. President, I should think that that was not included in the scope of the original resolution. It is something entirely different from what the committee was called upon in the first place to report upon. The instructions to the committee, as authorized by a vote of the Society, were that the committee should consider and report to the Society on the proper relation to each other of the sections of railway wheels and rails; to what extent and at what points it is expedient that their sections should be such as to bring them normally in contact, and to what extent and at what points it is not expedient that they should be so in contact; and that the committee be instructed to seek information from all those who are known to have given the subject attention. It may be that that could be stretched so as to cover the whole question, but it does not sound so to me.

Mr. A. FEELEY.—It seems to me that it does not require any stretch of the imagination at all to deem that the first desideratum in solving the question is to determine what are actually the best sections of rails. It seems to me that it is decidedly included in the general question, and that the point taken by Mr. Croes is not well taken.

Mr. CROES.—I should be very glad to see a section recommended by the committee. I only thought, that definite instructions having been given, the committee have reported; that if the committee was instructed to do something entirely different and to go beyond their duties, those who differed from the conclusions of the committee might raise the question with regard to the propriety and legality, that might affect them in the future.

Mr. BRUSH.—The principle put forth by Mr. Croes is an important one. When a resolution specifies facts, the sense of the resolution ought to be carried out by the committee. The question is whether this resolution of Mr. Shinn's is not included in the original resolution. This is a question upon which I want to call upon the chair to give his opinion.

Mr. COHEN.—Mr. President, I would move this further resolution: *Resolved*, That the Board of Direction be requested to consider the advisability of intrusting to the committee the further duty of reporting to the Society a standard set of rail sections; if it appears to them proper to do so, to so intrust that duty to the committee.

Mr. BRUSH.—Now the effect of that resolution would be to delay any action until a letter-ballot has been sent out. I have asked your opinion as to whether the resolution of Mr. Shinn is in order; one member says it is and another says it is not.

Major O. E. MICHAELIS.—I can see that the Society has no right to do by indirection that which the Constitution forbids directly. Of course, we cannot assign new duties to an old committee to do away with the more complicated way of appointing a new committee, but I do think the members here have this right: I think the majority of those

present can express their views and such views are binding, because if the other members differ, they ought to be here to express those differing views; those present, I think, are competent to discharge the committee, and their views ought to be acceded to by members who are not here—otherwise we would never reach a conclusion.

The CHAIR.—It seems to me that it would be far more satisfactory if the members of the Society should decide whether the motion of Mr. Shinn is not already included in the formal resolution under which the committee acted, than to leave it to the presiding officer to arbitrarily decide the question. I think the meeting is far more competent to decide that question. If a motion is made to the effect that the question ought to be decided by the Society at large, then it would settle the question.

Major MICHAELIS.—If Mr. Shinn's motion is put and a majority vote in favor of it, that decides the question so far as those here are concerned.

Mr. BRUSH.—The point I wish to make is that we all agree that it is desirable to appoint that committee; we all agree that it is desirable to get a report of that committee on standard rails. If the chairman of the Society rules that the motion of Mr. Shinn can be fairly included in the original resolution and no objection is made to the ruling of the President, why then we would not be placed under conditions where we would be criticised; we would not be acting in violation of the Constitution. On the other hand, if his ruling was dissented from and sustained, then it would be considered as having been passed by the Society.

Mr. CROES.—And have it appear upon the minutes that it was considered at a meeting of the Society, by being put to vote, one way or the other; so that in future we would have something to fall back upon.

The CHAIR.—It appears to me that the committee having already, in making their report, declared that their duties had been accomplished and asked to be discharged, evidently upon a full deliberation of their delegated powers, and upon reading the resolution itself, it appears to me that the powers of the committee have really been exhausted and that we could not again charge them with the execution of additional duties in connection with this matter. Is there any dissent from this ruling?

Mr. SHINN.—I accept the ruling.

Mr. COHEN.—Mr. President, the ruling of the Chair having been given, it would appear that there was but one thing to do, and that is, if it be desirable to intrust this committee with new duties, that a resolution to that effect should be offered here, and, if carried, the Board can consider whether it is advisable that these duties should be intrusted to them and a letter-ballot be sent out. If it be really

so beneficial that this committee, which has given so much time and careful thought and study to the subject, should now formulate a set of standards, the fact that it takes an additional month to notify them of that duty is a very unimportant matter. Therefore I would renew the resolution which I read a moment ago, and, if it is seconded, I think it would cover the desired action.

Mr. CROES.—Mr. President, I believe that there is a motion before the house that the report of the committee be received and the committee be discharged with the thanks of the Society for the valuable work which they have done.

Mr. COHEN.—I think the motion which was made, that the report of the committee be accepted, was proposed before that motion was carried. The committee has not been discharged, and I would move that before the committee is discharged this resolution be considered by the Society.

Mr. CROES.—I think that the discharge of the committee will come first; the committee ask to be discharged; I move that the committee be discharged with the thanks of the Society for the valuable work which they have done. (Seconded.)

Major MICHAELIS.—It seems to me that this is the only course to pursue under the President's decision; it only remains for us to discharge them with thanks.

The CHAIR.—Gentlemen, you have heard the motion of Mr. Croes to the effect that the committee be discharged with the thanks of the Society.

Mr. COHEN.—Mr. President, before putting the motion I would like to say, it seems to me that the same power which gave to that committee, not yet discharged, certain duties to perform, can give it certain other additional duties, and if it be desirable to retain the same committee, there is no reason why that additional function should not be given to them now, with the approval of the Board. That is the only reason why I shall vote no on the discharge of the committee.

Mr. CROES.—The vote cannot be taken on that to-day.

Mr. COHEN.—Through the regular form. The committee appear to intimate that there are certain functions which should be performed by them if the Society direct; it does not appear to me advisable to discharge them and go through the form of appointing them over again.

Mr. CROES.—Has the gentleman read the last part of the committee's report, that they have exhausted their authority and ask that another committee should be appointed?

The SECRETARY.—There is nothing said about another committee: "All that is included within the scope of its instructions it has now done. Anything beyond this must be done by a committee expressly appointed to recommend standard forms of rail sections, and not merely to 'consider the proper relations to each other of the sections of railway wheels and rails.'" It does not necessarily mean another committee.

Mr. CROES.—(Read from the report as follows): "Anything beyond this must be done by a committee expressly appointed to recommend standard forms of rail sections, and not merely to 'consider the proper relations to each other of the sections of railway wheels and rails.'"

The SECRETARY.—Now as I understand Mr. Cohen's motion, it is to expressly appoint this present committee to do this work, if the Society chooses to do so.

Mr. COHEN.—It can only be done under the rules of the Society. I believe this resolution was offered before the motion was made to discharge the committee. It will be for the Chair to decide what was in order.

The CHAIR.—There is no resolution before the meeting asking for the discharge of the committee, and no such motion has been carried; the motion was that the report of the committee be accepted, and it was definitely stated that the committee should not be considered discharged; it would seem to me, therefore, that Section 23 would not apply in this case, since the committee is still in function. They certainly could be instructed with additional duties by the Board.

Major MICHAELIS.—Mr. President, I must beg to differ from that view of the case; the Board cannot have more power in instructing committees, than the power that elects the Board.

The CHAIR.—The Board will simply act in accordance with instructions from the Society. If it receives instructions from the Society to the effect that this committee be further instructed to report on standard rail sections, the Board will do so.

Major MICHAELIS.—That was Mr. Shinn's motion, and the motion was declared to be out of order; the question was submitted to the Chair and the Chair decided that that was unconstitutional. The Constitution provides the methods for appointing committees and is silent in regard to methods of relegating new duties to old committees. I see no other course but to discharge this committee.

Mr. H. B. SEAMAN.—Isn't this a mere technical action? We can retain this committee just as well as we can give it new power.

Mr. COHEN.—If the gentleman will let me read the resolution, I think it will cover the whole thing: "*Resolved*, That the Board of Direction be requested to consider the advisability of intrusting to the committee the further duty of reporting to the Society a standard set of rail sections, and if it appears to them proper to do so, to intrust that duty to the committee."

Major MICHAELIS.—Will Mr. Cohen read that portion of the By-Laws under which he proposes this to be done?

(Section 23 was read.)

Major MICHAELIS.—Is that the only section of the By-Laws that refers to this matter? If so, the only thing that can be considered by the Board is the appointment of a special committee, not the question of giving further instructions to an old committee.

Mr. CROWELL.—I think the solution would be this: That a resolution be offered, naming the members of the old committee as the individuals who will constitute the new committee, and then let it take the same course that it would have taken if the present committee had not been in existence. We can pass a vote of thanks to the committee and discharge them, and if we do this, the first action is taken in proposing them for a new committee.

Mr. FTELEY.—There is now before the meeting a motion to that very effect, a resolution to discharge the committee with thanks.

Mr. T. GUILFORD SMITH.—No one seems to question the power of this meeting to accept the report and discharge the committee. Now if we have got power to discharge them, why not the power to continue them?

The CHAIR.—Because the By-Laws contain a provision for cases of that kind.

Mr. BRUSH.—I really don't see how this committee can take up a new function without a letter-ballot; you are adding a scope of work which will be entirely outside of the original resolution; the By-Laws require that the question of any work of this kind shall be submitted to the Society by a letter-ballot. The devising of a standard set of rail sections is an entirely new scope of work, and the authority for any such work must be governed by letter-ballot; besides, it seems to me it would be a dangerous precedent to establish that the Society could direct the appointment of a committee for a piece of work that might be unimportant, and then that the scope of work of this committee should be enlarged beyond anything that was originally intended. I think whatever is done should be done slowly and should carry the weight of the Society. When this committee makes this report, and the report which they make is one that is going to be of immense importance to the profession and to the railroad companies, it should carry with it all the weight that it possibly can carry, and if there is anything that even looks like technicality, it should be done away with. The whole weight of this Society will be carried in this matter, and it is desirable that this should come before the Society by letter-ballot, and in that view of the case it would be exceedingly desirable if Mr. Cohen should withdraw his motion and the committee be discharged with thanks, and another committee can be appointed by the Board of Direction, after they have sent out a letter-ballot, and the committee can go on.

Mr. COHEN.—I withdraw the resolution, sir; I see that under the present ruling of the Chair that is the only proper course.

Mr. SHINN.—I recognize the ruling of the Chair and a careful reading of the By-Laws has convinced me that my motion was out of order. I recognize the point that Mr. Brush has made as proper. I make a motion that the vote passed amending Mr. Croes' resolution be reconsidered and that will put us back on the original resolution. (Seconded.)

The CHAIR.—It is moved and seconded that the first resolution as passed, accepting the report of the committee, be reconsidered. (Carried.)

Mr. CROES.—I make my motion: *Resolved*, That the report of the committee upon the proper relation to each other of the sections of railway wheels and rails be received, and that the committee be discharged with the thanks of the Society for the very valuable work which they have done. (Vote put and carried.)

Now, Mr. President, I think that if Mr. Cohen would offer his resolution naming the persons to be appointed upon this committee, the Society is prepared to receive it.

The SECRETARY.—The proper resolution is that a committee be appointed who shall report for the consideration of the Society the forms of standard sections of rails, giving the details as Mr. Shinn has done, and I suggest that it is not desirable that we should, in sending out a letter-ballot, complicate it with the names of that committee; that the Board of Direction appoint that committee. There may be some members of that committee who cannot serve. The Board of Direction will appoint upon the committee all the members of the old committee, probably, who may be willing to serve again. I suggest that the resolution be for a special committee to report for the consideration of the Society a standard section of rails, then giving the details of it as Mr. Shinn did in his motion, such committee to be appointed by the Board of Direction. If this is offered here and seconded, then it goes immediately to the Board of Direction, which reports upon the expediency of it if it chooses and sends it out within a month to letter-ballot, and I would not complicate it with names. I am making this merely as a suggestion.

Mr. SHINN.—I make the motion in the form suggested by Mr. Bogart. (Seconded.)

The CHAIR.—It is moved and seconded that a committee to be appointed by the Board of Direction should be authorized and instructed to report to the Society a set of standard rail sections of weights beginning at 40 pounds and advancing by increments of 5 pounds to 100 pounds per linear yard.

This was carried. Under the provisions of the By-Laws it goes to the Board for letter-ballot.

The SECRETARY.—The next business in order would be the report of the Standing Committee on Uniform Standard Time.

Mr. SHINN.—Mr. President, I am again called upon to act in a representative capacity. The chairman of the Committee on Standard Time, Mr. Sanford Fleming, has written me this letter, which suggests a certain line of action by the Society.

OTTAWA, June 7th, 1889.

WILLIAM P. SHINN, Esq.,
Director Am. Soc. C. E.

DEAR SIR,—I had a letter from Dr. Egleston a short time back in which he mentioned having seen you, and to some extent discussed with you the question of time notation, which is being considered by the Special Committee Am. Soc. C. E., of which I am chairman. I believe you sympathize with our views and efforts, and you were good enough to say to Dr. Egleston that I might write to you on the subject whenever I felt that a practical turn could be given to our efforts, and that if any man would or could, Dr. Egleston believed you would very materially help forward the movement.

The present stage of the movement is to get the 24-hour notation generally adopted. To accomplish this, we aim at two things: 1st. To educate the public mind up to the change by keeping the idea constantly before the community. 2d. To secure the co-operation of the railway companies as soon as practicable. These two-fold objects, we think, can be promoted at the same time and they will mutually advance each other. A great deal of correspondence has passed between members of the committee since the annual meeting in January last as to the best means of effecting these objects and the carrying into effect a resolution of the Society "that further efforts be made to secure the adoption of the new notation." About ten months ago the following members of the committee unanimously agreed on the course to be followed: Messrs. Charles Paine, Theodore N. Ely, J. M. Toucey, Dr. Egleston, Professor Hilgard, Sandford Fleming.

The committee, after much deliberation, decided that the best course is to issue for general information the report presented at the last annual meeting of the Society, together with a full list of railway men and others in favor of the 24-hour notation; to send this out with a circular inviting an expression of opinion. I inclose a copy of the form of circular unanimously agreed on.

The report* and the list of persons favorable to the new system has been printed in pamphlet form, and I have just received from Mr. Bogaart a few advance copies, one of which I inclose. I have not as yet seen a printed copy of the circular and reply, recommended by the committee to be issued, but I hope they will be ready before long and that they will be widely circulated.

It is on this point more especially that I take the liberty of writing you. The opinion is very strong with me that at this particular stage we want an expression from as wide a circle of railway men as possible, and this will depend on the number of copies issued and the means taken to bring them to the notice of railway men of standing. I am quite aware that many busy men will send no replies, but others will, and all will be more or less informed on the present condition of the movement by sending to them these papers, and will be thereby the more ready to acquiesce in the adoption of the new notation. If we can thus establish that there is a general feeling in favor of the change throughout the country, and especially among railway men, Mr. Toucey's idea can then be acted on, and if thought advisable, the Government asked to authorize the change.

The only difficulty which I can see is to bring the printed papers to the notice of all the principal railway men in the country. There are

* See Proceedings for January, 1889 p. 30.

about four hundred separate corporations, and to send copies to but four of the principal officers would involve addressing 1 600 envelopes. It might, however, be possible to reach most of them by addressing the Secretary of each company, sending each a few copies, and by inviting him to be obliging enough to bring them to the notice of the chief officers of his company most likely to give attention to them. If this be done, the clerical work in Mr. Bogart's office would be very much reduced. In fact, it would be limited to sending out some four hundred addressed envelopes each inclosing, say, from three to five copies of report, with, say, half a dozen copies of Circular A (replies attached) and a single lithographed or type-written circular to Secretaries of railway companies.

In addition to this, it would be highly proper to send one copy of report and circular (with form of reply) to each member of the American Society of Civil Engineers.

I have troubled you at considerable length. My excuse is my earnest desire to do my duty as Chairman of the Special Committee. I trust as a member of the Board of Direction you will see your way to urge the immediate carrying out of the recommendations of the Committee or the adoption of some other course equally well calculated to accomplish the desired end.

Believe me,

Dear Mr. SHINN,

Yours very truly,

SANDFORD FLEMING.

Mr. SHINN.—For the purpose of bringing it before the meeting, I move that the Board of Direction be authorized and requested to send out not to exceed 2 000 copies of the last report of the Special Committee on Uniform Standard Time, at the expense of the Society, in addition to the number required to supply the members. (Carried.)

The SECRETARY.—We have no other reports from committees.

The CHAIR.—Unfinished business is next in order. None being now presented, new business is next in order.

Mr. COHEN.—Mr. President, it may not be known to all the members of this Society that there has been established by the Smithsonian Institution in the National Museum, at Washington, a department for the preservation of objects of interest relating to the history of engineering in this country. They have done a great deal of work in that direction. Mr. J. F. Watkins, Assoc. Am. Soc. C. E., the Curator of the Museum, presented with the paper he has read many objects of the greatest interest to engineers, including original sections of many early rails. Very much has been done towards establishing the nucleus of a very interesting collection at the Museum, and I think this project should be of active interest to the engineering profession throughout the country. In that view, I would offer the following preamble and resolution:

Whereas, The authorities of the Smithsonian Institution have established in the National Museum, at Washington, a department devoted to the preservation of the history of American engineering science;

Resolved, That the American Society of Civil Engineers hereby expresses its gratification at the establishment by the Smithsonian Institution, with the authority of the general Government, of a department in the National Museum for the preservation of objects of interest bearing upon the history of American engineering, and recommends that American engineers co-operate with the Smithsonian Institution in furthering the objects for which the Department of Engineering has been established:

Resolved, That copies of this resolution be sent to the Secretary of the Smithsonian Institution and to the Curator of the Engineering Department of the National Museum.

(Seconded. Carried.)

Mr. H. B. SEAMAN.—I was just about to bring forward a new subject. At the Kaaterskill Convention there was a motion laid upon the table—the appointment of a committee upon bridge specifications; that was laid upon the table, to be taken up at some future time. I think that motion involves a very complicated, a very important subject, the theory of bridge specifications. There is, however, a portion of bridge specifications which are almost uniform, and yet not near enough so to be satisfactory—that portion relating to the material and workmanship of railroad bridges. It is not necessary to dwell upon the value of a uniform specification. The manufacturers have shown us their appreciation of that value by devoting a great deal of time and labor to devising their specifications. There is no specification in the country to-day, among engineers, which carries with it the weight that the manufacturers' specifications carry. It is for such a specification, drawn up with equal care by a body of professional men, that I would offer this resolution:

Resolved, That a committee of seven members of this Society be appointed by the Board of Direction to devise and report a uniform specification for the material and workmanship of railroad bridges. And that the committee be requested to make a preliminary report, subject to discussion, at a meeting of the Society previous to its final report.

I move that this resolution be referred to the Board of Direction, with a request for its determination, according to By-Law 23, of the issue to letter-ballot. (Seconded.)

Mr. ELIOT C. CLARKE.—Do I understand that "railroad bridges" covers all bridges, wooden and iron?

Mr. SEAMAN.—The object was to include iron and steel; the material of wooden bridges, with the exception of the iron, is small.

Mr. CLARKE.—As drawn?

Mr. SEAMAN.—No, this states railroad bridges; perhaps I had better make it read so as to include iron and steel as well.

Mr. CROES.—As drawn it would cover the specifications for masonry bridges also.

I should think we might as well amend that resolution by appointing a committee of seventeen to draw specifications on all subjects, complete specifications for public work.

I would amend the resolution by making it seventeen members to draw complete specifications for public works.

Mr. F. COLLINGWOOD.—I agree with Mr. Croes. Years ago we had this subject up before us and there was a strong effort made to make a uniform specification. I think that a committee could only go part way with such a specification, and by the time we got a set of standard specifications we would all be gray. I don't agree at all with the idea that we, as members, want to be tied down to the specifications of a committee; we each one want to do that for ourselves very largely.

Mr. SEAMAN.—I would like to ask Mr. Collingwood if we have not had a committee appointed on uniform tests of cement?

Mr. COLLINGWOOD. — That is a totally different matter; those are experiments. I agree entirely with the idea of testing; that is a matter which involves a large amount of work, there is a vast amount of labor to be done; there is every reason why there should be uniformity in methods of testing, but when we come to specifications that is a very different thing; when we come to say that we shall try to do work exactly by a sure rule, that is another matter.

Mr. F. W. SKINNER.—I agree with Mr. Collingwood. I think that whereas the value of specifications and their consideration is of importance, the time is not ripe for making general standard specifications, nor do we as a body wish to assume the responsibility of it. We have now a couple of specifications, which go into great detail and which give a very excellent starting point for individual designers. I think no engineer who is capable of making a large structure wishes to be tied down to a certain specification. The adoption of such specifications, which would be difficult to secure, would hamper more than help us. There is a great deal of progress yet to be made before we are ready for it. I think, as regards the workmanship, that can hardly be made a very fruitful source of standard specifications; things of this sort cannot be covered by a body; there are always questions which go back to the Chief Engineer for settlement. Different forms of construction require such different material that an attempt to cover them all would do more harm than good. Manufacturers' specifications have done some good, but they are prepared from the manufacturer's standpoint.

The matter of tests is very opportune to the question. From the cement tests we have experienced a great deal of good; the requiring a uniformity of methods of testing would work to great advantage; but as regards general specifications, it seems to me the matter stands very well as it is.

Mr. SHINN.—The matter of standards is one that we want to be very careful about using and not abusing. It is a very valuable thing to have standards in those things which are produced by tens and hundreds of thousands, but not in those things which are produced by tens or hundreds. When we adopt a standard we stop improvement in that direction,

and the tendency of standards in railroad machinery has already shown this to some extent. It strikes me, not being a bridge constructor myself, that it would be unwise to attempt to set up a standard of specifications in material and workmanship of bridges. The case that the mover of the resolution suggests, that we appointed a committee which reported upon standard tests of cement, is not *apropos*. The question then was that we should adopt the language in which we could report the result of our test. The results were not expressed in the same language previously. In methods of test it is important that we should have standards, but we should be careful not to set up standards in such delicate matters as bridge construction.

Mr. SEAMAN.—I would like to say that the remarks of Mr. Shinn apply directly to the tests on materials. There is information to be sought in this direction, and it can only be sought by a committee of this kind. In regard to the remarks of Mr. Collingwood, it seems to me that they directly conflict. Mr. Skinner mentions that we haven't enough information on which to work. Mr. Collingwood mentions that we have all the information and don't need the committee.

Mr. COLLINGWOOD.—We haven't got enough information yet for national standards of steel construction, but we are working up to it.

Mr. SEAMAN.—I would like to state this: there is no word standard in that motion; simply that we obtain more information and uniform information on this subject.

Mr. C. C. SCHNEIDER.—Mr. Seaman wants a committee that will recommend a uniform specification, not enforce it upon the Society—recommend it, that is all—of material and workmanship.

Mr. SEAMAN.—There is nothing compulsory.

Mr. SKINNER.—Is it intended to provide a standard in that matter?

Mr. SEAMAN.—No, sir; simply an investigation; such an investigation would always be a matter of authority, as it should be.

Mr. SHINN.—I would like to point out the fact, as the report of the committee on tests of cement has been brought up, that it is a matter of history that the committee on tests of cement made a report in which they not only reported in regard to the manner in which tests should be made, but they undertook to report a standard of cements, and it was the sense of the Society that that was a subject on which they were not desired to report at that time, and if the mover of this resolution had made it a resolution to devise a uniform method of testing of iron and metals used in bridge construction, it would be something like the Committee on Tests of Cement; but when such a committee as he asks is suggested, the scope of the resolution is very much wider, and recommends their reporting a standard specification as to material and workmanship.

Mr. SEAMAN.—I would like to say that I first had the resolution made out in this way: To devise and report a uniform system of tests of

material and workmanship of railroad bridges; but our experience of this morning taught me that we had better not restrict our committees too much. They will be composed of representative members of the body, and they will restrict themselves according to their judgment.

The CHAIR.—The question now is, to refer the motion to the Board of Direction, with a recommendation for its adoption according to By-Law 23 for issue by letter-ballot.

Mr. BRUSH.—I am going to present a somewhat similar resolution on another subject, and, therefore, I can speak very freely. I don't think this Convention ought to pass such a resolution. Our Society is composed of some twelve hundred members, and here we are about one hundred in this room. I think that the design of that By-Law is that when any such resolution is referred to the Board of Direction, the Board of Direction should prepare a concise statement of the arguments for and against, and it then should be sent out to the sober, quiet judgment of all our members. I don't think they should be hampered by the resolution here to-day. I think that these resolutions should be subjected to the criticism and quiet consideration of our members by letter-ballot, and should be simply sent out with such arguments for and against them as the Board of Direction think proper to do. All that ought to be done, is simply to refer it to the Board of Direction without any recommendations. I think it is unfair for this business meeting of the Society to make any recommendation to the Board.

Mr. SEAMAN.—The understanding is that the recommendation was not to the Board, but to the Society. The Board, as I understand it, can act or can refuse to act; that the meeting recommends the resolution. That is not a recommendation to the Board.

Mr. CROES.—The Board of Direction has no discretion in the matter, so far as issuing the letter-ballot is concerned; this whole meeting could not change the duty of the Board; they have got to present the arguments for and against.

We had a great deal of trouble with this very sort of thing, of determinations by a small number of members of the Society assembled together, and there was a complaint made that they were having committees appointed favoring local interests, and this By-Law was drawn so that a resolution goes unhampered by any restriction to the Board of Direction, who present the arguments concisely, for and against its adoption, and send it out to the Society; or they send it out without comment. I think the arguments would be pretty much one-sided myself, but that is their business. Let every man have a chance to vote upon it.

Mr. SEAMAN.—In regard to Mr. Croes' objection, I would like to say that I have copied this almost verbatim from the previous motion as to our Committee on Tests of Cement.

Mr. CROES.—Almost verbatim covers a great deal of ground.

Mr. SEAMAN.—You can refer to the Proceedings.

Mr. COLLINGWOOD.—Are we to understand that if a dozen such resolutions should be offered here, this meeting can say nothing at all about it, but they must all be sent out for the consideration of the Society? I suppose that if this meeting voted down a resolution it was not to be referred to the Society.

Mr. CROES.—I do not think you can limit the offering of resolutions. Every man here might offer a resolution.

Mr. COHEN.—I rise to a point of order. If I rise and offer a resolution here and the resolution is voted down, it becomes null. I cannot rise and say I want to offer a resolution that there shall be a special committee appointed for some particular thing, and when the Convention calls it nonsense and votes it down, it shall be considered by the Board; that certainly cannot be intended. A resolution is not a resolution because I write it out upon a scrap of paper.

May I read, sir? (Read Section 23 of the By-Laws.)

A slip of paper which I may prepare and send in to the Board of Direction is not a resolution; a resolution is something that has been passed at a meeting of the Society. If we should adopt the resolution that Mr. Seaman has offered, that is submitted to the Board; and if that is voted down, that ends it.

The SECRETARY.—Mr. President, it has been ruled previously when such resolutions proposing special committees to report on engineering subjects have been offered that a meeting of the Society could not vote on such resolution; that it must be referred to the Board of Direction and then passed upon by letter-ballot. If members of the Society in full standing choose to offer a resolution and get some other member to second it, I do not see under our present By-Laws how we are going to help taking a letter-ballot. A meeting can, of course, determine the sense of that meeting in favor of or against such resolution.

Mr. SHINN.—I think if that ruling has been made it is nearly time it was reversed; if we have got any bad law let us turn it into a good law. A resolution is not a paper offered by somebody and seconded by somebody; that is a motion. It begins with the word "resolved;" now we do not resolve until we do resolve. I think the plain meaning of this By-Law is that when the Society at any of its meetings resolves that such a committee shall be appointed, the By-Law recognizes that that meeting does not consist of the whole body of members, and that the rest of the members have a right to be heard; therefore, it seems to me that it is time that the present incumbent of the Chair reversed this previous ruling, and I don't believe that this meeting will reverse him if he does find that a resolution is not a resolution until it is adopted. If this By-Law had meant otherwise, it would have said the proposition, or something of that sort, for the appointment of a committee;

if it intended that any member could send in at any time a proposition to have a committee appointed, it would have used different language. But in using the language employed, a "resolution proposing" means after it shall have been adopted.

Mr. CROES.—I differ entirely from the gentleman. I know something about the adoption of that By-Law and its preparation. I think I wrote that sentence, "Any resolution proposing such a committee," and I wrote it carefully and advisedly. It meant just what it said. The precedent which the gentleman seeks to establish here is one of the most dangerous ones which could possibly be established. It brings up this whole question of a central society, and its members scattered all over the country. If ten or fifteen members at a meeting might vote down a proposition made in good faith by a number of members, by members perhaps away from the regular place of meeting of the Society, we would have it said that this little set of members assumed to dictate to the whole Society just what they should do, and it was for that very reason that this by-law was adopted; and, I maintain, with all due deference to Mr. Shinn, that the meeting is right, and that the Chair is right, and that every man has a right to a vote; that the motion or resolution, call it whatever you like, should come before the whole Society. And if the Board of Direction does its duty it will present a short statement of arguments; and, as Mr. Bogart has suggested, it is very well to put in that statement of arguments that at the meeting of the Society forty-eight or forty-nine members voted against or voted for it. But we must put it before the whole Society in the form in which it was presented.

Major MICHAELIS.—I would like to ask the gentleman who has just spoken, why were business meetings at all provided for? What is the function of a business meeting? We never have more than forty or fifty members at a meeting, and that same rule, if carried, would apply to all resolutions.

Mr. SEAMAN.—I would like to indorse that. I think this is the meeting that should refer this to the Board of Direction. I would not like individually to do it through the meeting; I think we have got to pass it by a vote.

The SECRETARY.—In answer to Major Michaelis' point; this is a special clause in the By-Laws referring to a certain kind of resolution. It does not say that all resolutions, but only a resolution proposing a special committee.

Major MICHAELIS.—I understand that.

The SECRETARY.—We are discussing the law, not the merits of the law. As Mr. Croes has touched the point, not so much was that amendment to the By-Laws proposed and adopted with the idea of preventing a small meeting of the Society from appointing committees, as with the idea of preventing a small meeting of the Society from having the veto

power over the great majority, and, if you notice the very last clause of the By-Law, that idea is fully carried out; the Board of Direction have not got a veto power upon it; if the Board of Direction does not choose to say anything in favor of or against the resolution the Society can act on it nevertheless. The Secretary's duty is to send it out, and if the Board of Direction does not act within a month the Society has a right to vote. It is a question whether that By-Law should give the veto power to twenty or twenty-five members upon a proposition to appoint a committee on an engineering subject. If the technical point raised by Mr. Shinn is true, then certainly the twenty-five men have a veto power over any resolution proposing to appoint a committee on an engineering subject.

Mr. SHINN.—That seems to me at first sight to be conclusive. It has been decided over and over again by the courts that laws must be considered by the plain meaning of their language and not by the intention of the persons who use that language. I have a distinct recollection myself of having written an amendment in regard to the manner in which the Constitution should be amended, and the meaning which I intended to convey was decided not to be conveyed, and that amendment had to be again amended in order to carry out the intention which I had in my mind. It seems to me that Mr. Croes and the Secretary are both overestimating the bad effect that would arise if the construction is put on this language that I put. I do not think that ordinary meetings of the Society will refuse to let the appointment of a committee go out, if there is reasonable ground for its going out; and if one meeting does so refuse, there is nothing which prevents the same proposition being brought up at some other meeting; but even if there were, it seems to me the plain meaning of the language used in this by-law should be adhered to, and I cannot too strongly impress upon the members the idea which I have that a resolution is not a resolution until it is adopted; it is merely a motion. If Mr. Croes, in writing this, had intended that a proposition should be referred to the Board of Direction, that would have been plain enough, but in this case it says a resolution in the By-Law. There is as yet no resolution, there has been a motion made that a resolution be adopted.

Major MICHAELIS.—I remember a precedent now that bears very closely on this case. I remember at one of our conventions, during the convention a committee which reported progress, was discharged by a simple vote of the business meeting at the convention. Now if a business meeting had the power by a majority vote to discharge a committee which has not completed its work, it certainly must have this power. That was the Committee on Tests of Material, which was discharged at the Montreal Convention.

The CHAIR.—Upon the mere reading of the By-Laws I first felt inclined to side with the views taken by Mr. Cohen and Mr. Shinn.

More particular reading would seem to indicate that the meeting has no power at all to act in the matter, would play no part whatever, and that under any condition any members presenting a resolution of this character would have the right that it should be referred to the Board. Now it would seem that if action must be taken by letter-ballot, what is the object of having such a resolution brought before the meeting when the meeting cannot do anything whatever finally in the matter?

There is a great deal of force in the interpretation given by Mr. Croes, and I can readily see that a ruling giving a meeting power over such a proposition would establish a precedent which I think would be far more dangerous than if the opposite course was taken, and if now called upon to rule, I would rule adversely to the views of Mr. Cohen and Mr. Shinn; but at the same time I believe that the proper measure to be taken, which Mr. Bogart suggested, is to take the sense of the members present by a vote, and let the Board of Direction incorporate that in the communication addressed to the members with the letter-ballot, so that they may be informed of the sense of the meeting.

Major MICHAELIS.—I think such a view might be under some circumstances destructive of the Society, because there might be in existence five or six members in good standing who might not have the best interests of the Society at heart, and they might swamp the Board of Direction with resolutions which the Board would be obliged to send out, and these five or six members might bankrupt the Society.

I move that it is the sense of this meeting, that the word "resolution," in Section 23, means a resolution that has been passed by a majority of the members present at the business meeting.

Mr. CROES.—I hope that Major Michaelis' resolution will not pass in the present shape. I do not know that this little meeting is called upon to express an opinion upon a constitutional point in the By-Laws in that way. It does not carry any weight with it and it would create a very bad feeling.

Mr. COHEN.—It may be reversed at any other meeting. It is a great deal better to do it by an amendment to the By-Laws.

Mr. FTELEY.—It seems to me that the motion made by Major Michaelis is a disguised appeal against the ruling of the Chair. If it be so, let us say so; if the gentleman wants to say that he wants to appeal from the ruling of the Chair.

Major MICHAELIS.—I do not think the Chair has made any decision.

Mr. SHINN.—I think the proper way is to simply appeal from the decision of the Chair.

Major MICHAELIS.—I did not understand that the Chair had made any ruling, or I should have appealed from such decision. I do think the members of the Society who come from all over the United States to a business meeting of the Convention must certainly have some rights. If you are going to decide that the members who come to the Conven-

tion have no rights, then you will have no business meetings at all. Under these circumstances, sir, I do appeal from the decision of the Chair.

Mr. BRUSH.—I simply want to say one thing: that the idea that this question affects the general business meetings, it seems to me is entirely wrong; it simply affects the appointment of standing committees on an engineering subject. The question we are considering is the important one of the appointment of standing committees, and the Society has felt for years that it was a very important thing, and one in which it should go slowly. I think the ruling of the President is right; it is one of the things in regard to which the Society should hold to certain rules.

Major MICHAELIS.—I must have been exceedingly unhappy in my choice of language. The question that I raised does concern the general business meeting of the Society. I raise this point: that by a vote, a business meeting of the Society has a right to prevent, by its action, ruinous expense to the Society. This meeting should have and must have, and I believe has the right as such to prevent such proceedings.

Mr. COLLINGWOOD.—The feeling that I have is rather averse to that expressed by Mr. Croes in offering this resolution. I confess to being somewhat conservative. I do not want to see every subject brought up before the Society as a whole. I know that when a resolution comes up before the Society, the chances are that unless it be positively bad, it will be carried. Those who are interested in it will push it, possibly against the better interests of the Society. I have no objection especially against this proposed action except this: this thing has been up at least once before, and it was voted down. It was in a meeting exactly like this that it was voted down. If the resolution proposed a committee to report upon a method of making tests of material for bridges I should have been in favor of it; but I do not like it in this shape. I think, however, that in a meeting of this sort, which is composed of representative men from all parts of the country, we would be quite as apt to get an honest expression of opinion by a vote upon such a resolution as this, as if it were submitted to a letter-ballot.

Mr. SEAMAN.—It was not my intention in introducing this resolution to create any dissension. It has created a great deal more discussion than there was any thought of, but rather than this should be the cause of any dissension I will withdraw the resolution.

Major MICHAELIS.—I withdraw the appeal.

Mr. BRUSH.—I offer the following resolution:

Whereas, It is a well-known fact that many cities and towns on the Atlantic coast have suffered very greatly from impurities in their water supplies due to various causes, and that no adequate remedy, meeting all conditions, has been found therefor; and

Whereas, These impurities are often due to natural causes, which have not been adequately investigated on account of the difficulty of

centralizing the individual efforts of all parties engaged in said investigations;

Resolved, That a committee of three members of this Society be appointed by the President to ascertain the best means of concentrating all obtainable information in such a manner as to secure useful results, and to report to the annual meeting of this Society what further action in their opinion should be taken in the premises.

Seconded by Mr. Cohen.

MR. COHEN.—I was greatly impressed by the remarks made by Mr. Brush yesterday, and it has been within my own observation in several cases that we have had these troubles with our city water supplies. We have not been able to ascertain the causes, and the causes assigned are so different at different times and in different localities, that I think something of that sort is very desirable. I am a resident of the city of Baltimore, where we have, I believe, the finest water supply in the country. It is a very abundant supply; the mains are not very large, and, therefore, the flow of water through the mains is likely to be in very active motion, and as the water in the reservoirs is, I believe, frequently changed, it does not become stagnant. The water is introduced into the reservoirs through jets, and is aerated to a greater or less extent, and yet we have there quite frequently this problem of offensiveness. I left Baltimore a few days ago, and I noticed the fact in passing one of the fountains that an offensive odor was very perceptible. We have had an unusual quantity of rain and I do not think the water is likely to be stagnant just now, and yet this thing was very evidently occurring. The cause assigned is this little microscopical animal or plant. I think we have very much still to learn concerning these microscopical plants or animals and that this information can only be collated by some intelligent committee who are devoted to the subject, and I hope the resolution may be adopted.

MR. SHINN.—I would like to call the attention of the members to the fact that Mr. Brush was instructed by a unanimous vote of the Board of Direction to present the matter in this way to the Convention, and I sincerely hope that the resolution which he proposes will pass unanimously. This is not offered to establish a standard of pure water, but simply an effort to ascertain the condition of the water, and whether any element in it is dangerous to life. It is a matter in which the co-operation of engineers and chemists is readily obtainable, and it is important that such action as Mr. Brush proposes should be taken in order to establish a body that could be appealed to in such matters.

MR. CROES.—This resolution comes under By-Law 23. It gives me an opportunity to offer the resolution which I intended to offer with regard to the other one. This resolution goes to the Board of Direction. Under the rules it is perfectly proper that this meeting express an opinion that it is desirable that such a committee be appointed, and I make this motion:

Resolved, That it is the sense of this meeting that the committee named in the resolution offered by Mr. Brush should be appointed.

That will give an expression of the opinion of this meeting upon it, and it would go out to the Society with that indorsement for all that is worth. (Seconded.)

The CHAIR.—The motion of Mr. Croes is before you, that this meeting express by a vote their approbation or dissent in regard to the resolution which is offered by Mr. Brush, which motion is referred to the Board of Direction for further action under Section 23 of the By-Laws.

The motion was carried.

Mr. SHINN.—It seems to be my fortune or misfortune to be called upon in a representative capacity. Some members of the Society who are not here to-day requested me to present a subject at this meeting. The correspondence upon this subject began nearly a year ago. I was invited by these gentlemen to join them in an effort to bring about the proposed action, and suggested that the better time and place was at the Annual Convention. It is on the subject of the systematic amendment of the Constitution. The Constitution, as the gentlemen are aware, is a thing of shreds and patches, amended from time to time by adding here and taking off there, so that now it is somewhat disconnected and unsatisfactory. There is a feeling of unrest among a large section of our members, particularly our Western members, in regard to the Constitution.

Whether it is justified or not, I am not expressing an opinion. Previous experience has shown that it is wiser to take cognizance of such feelings than it is to ignore them. I therefore offer these resolutions on the subject of the systematic amendment of the Constitution:

Resolved, That a committee of seven members of this Society be appointed by the President to consider and report upon a systematic revision of the Constitution and By-Laws, so as to afford the Society the best basis for its continued growth and an increased measure of usefulness.

Resolved, That all members having suggestions to make upon the subjects referred to the committee, or amendments to offer to the Constitution or By-Laws, be requested to send the same to the chairman of the committee.

Resolved, That the committee, if it decide to recommend any amendments to the Constitution or By-Laws, be instructed to present the same, together with the views of the committee upon the same, in the manner and within the time provided for offering such amendments.

Resolved, That the Board of Direction be requested to have the report of the committee printed and distributed to the members, with the proposed amendments.

Resolved, That the committee be authorized to confer with any committees appointed for the purpose, by the local engineering societies, with a view of determining whether a satisfactory basis can be established for affiliating therewith.

Resolved, That the committee make a final report at the next Annual Meeting.

In offering these resolutions, I do not wish to confine the committee to any particular form of amendment to the Constitution. All the members, I presume, have received, as I have, a copy of the proposed amendments issued by the Cincinnati members. I have in my possession a copy of some of the proposed amendments prepared by some of the Missouri members. I promised two or three of those members who intended to present them at this meeting, that I would present the subject for them in this way. It seemed to me wise that if the Constitution is to be materially amended, it should be done by a committee appointed for the purpose; that they should consider all the amendments that might be offered, and that they should so formulate an amendment to the Constitution, that it should not be at variance with itself, as our Constitution has been found to be at times.

As to the suggestions that are made of the power to be given to the committee to confer with representatives of local societies, that was specially requested by the persons who asked me to present the matter. There seems to be some reason for considering the subject at this time. The Board of Direction has, I have reason to know, more or less trouble to get a sufficient number of papers to present to the Society, and to keep its transactions up to the high standard that they have heretofore borne. Some of us know that one cause of this is that a member who belongs to a local society and can read his paper before forty or fifty of his friends, prefers to do so rather than to send it to the Secretary at New York and have it read before forty or fifty members of the Society there. The life of a society of this kind depends upon the number and character of its papers, and unless these papers and transactions interest the profession, we cannot hope to go on and increase both in numbers and usefulness as we have done. It is for the purpose of getting that matter before the meeting that I offer that resolution.

Mr. CROWELL.—I second the resolution. I desire to say that I also am a representative of some of the members of the Society from Cincinnati. Mr. Whinery proposed to do this, and, in his absence, requested me, not knowing of Mr. Shinn's intention to propose a committee, to bring to the attention of the Society as a body the formal views which the Cincinnati members had adopted. As most of the members have probably seen the form of the amendments proposed by the Cincinnati members, it is unnecessary for me, in seconding Mr. Shinn's motion, to read them; but I will merely say that the Cincinnati members have given so much attention to the matter, that their views are entitled to be considered by the committee as such, and I think that in their estimation that would be the best way to bring them before the Society, so I simply offer their views in seconding the motion.

Mr. BRUSH.—The very important subject that has been presented will, of course, receive consideration and discussion among us. It is now half an hour after the time for our regular adjournment so I move

that when we adjourn, we adjourn to meet at 14 o'clock, and the first business which we take up be the election of a Nominating Committee, and then take up this business immediately afterwards. I think we had better begin with the appointment of a Nominating Committee and let the consideration of this subject immediately follow.

Mr. CROES.—I beg to suggest to the gentlemen that it be a recess.

Mr. BRUSH.—I now move that we take a recess to 2 o'clock, and the first business be the appointment of the Nominating Committee.

The SECRETARY.—I rise to a point of order. You are so strictly technical to-day that I shall have to call your attention to Section 24 of the By-Laws, which provides that "At the Annual Convention a Nominating Committee shall be appointed by the Convention." This is a business meeting of the Society and not a session of the Convention.

Mr. BRUSH.—I withdraw it all; I move we take a recess.

The CHAIR.—This meeting will take a recess until 2 o'clock.

The SECRETARY.—Fourteen o'clock.

BUSINESS MEETING, AFTERNOON SESSION.—The business meeting of the Society took a recess until after the session of the Convention.

(The Convention met and appointed the Nominating Committee. See page 66.)

The business meeting was then resumed, President Becker in the chair.

The SECRETARY.—We were considering, sir, the question of the appointment of a committee of seven members to consider the revision of the Constitution.

The CHAIR.—Are there any remarks on that subject?

The SECRETARY.—I am requested, Mr. President, to read the resolutions.

The Secretary read the resolutions, as above.

Mr. President, I am requested to present the following discussion by Mr. A. M. Wellington, who is unavoidably absent:

Mr. A. M. WELLINGTON.—"As professional engagements compel me to be absent from this Convention, I submit the following suggestions as to the proposed amended form of the Constitution, which has been submitted by the Cincinnati Association of Members of the American Society of Civil Engineers.

"In my judgment, some action of the kind, to remedy defects which time has developed, is urgently needed, although I was not aware that any such action was contemplated. Many of the proposed changes seem to me eminently judicious, but others of questionable propriety, while certain desirable changes are not touched upon at all in the draft. The proposed changes, as they stand, however, amount practically to a new Constitution; and they ought to do so, as the old form has been so tinkered in detail as to be ill arranged and needlessly verbose, as well as imperfect in substance.

"Any such radical change ought not to be adopted hastily, nor without previously consulting the entire membership, by circular, as to the separate parts of the instrument. Such a course is much more likely to result in a finally acceptable form than if any committee attempt to elaborate a form, acting on their own judgment alone.

"I would suggest the appointment of a committee of not over seven, and not too scattered in residence, so that they may be able to get a quorum together, who should take up the articles of the Constitution relating to the following eight heads separately; submit amended forms for them tentatively to the membership, and after digesting the responses sent in, draft a final form for submission in the constitutional manner. All the articles of the Constitution may be classified under the following eight heads:

1. Name and purpose of the Society.
2. Membership, Grades, and Qualifications, and Privileges thereof.
3. Election, Transfer and Expulsion of Members.
4. Number, Qualifications and Elections of Officers.
5. Duties of Officers and Committees.
6. Dues and Payment thereof.
7. Stated and Special Meetings.
8. Amendments.

"By elaborating the articles under these heads separately, and perfecting them one by one to the satisfaction of a majority of the membership before proceeding to another, there can be no doubt that agreement would be secured. By drafting a whole Constitution for formal submission without so consulting the membership, there is less chance of acceptance of the Committee work, and much less chance of the most judicious action. The Committee on the Form of Rails and Wheels has found this method of consultation by circular to work exceedingly well, easily leading up to agreement, where before there was chaos.

"I believe the practical end sought would be best attained by appointing a committee of seven, consisting exclusively of members residing within 100 miles of some one city; which it would not matter, as the consultation by circular would eliminate all local tendency; but in order to make the committee still more representative, it might be appointed by a general vote, striking names from a list of say twenty nominees."

The CHAIR.—Any further discussion?

Mr. BRUSH.—The resolution before the meeting is the resolution of Mr. Shinn.

Mr. A. FFELEY.—Mr. Wellington does not present any motion, he simply states his ideas. The paper before us is Mr. Shinn's motion, but there are several divisions of that motion, and I suggest that we shall take them one by one, and discuss them.

The CHAIR.—The resolution consists of six parts.

Mr. MENDES COHEN.—It occurred to me, Mr. President, that Mr. Shinn's resolution called for a committee to which should be referred the consideration of all this detail. I am afraid that in this comparatively small meeting we could scarcely discuss amendments to the Con-

stitution with much profit, and, if this committee be appointed, if the resolution be carried by the Society in this meeting, the proposed amendments, either from the gentlemen from Cincinnati or from other sources, will be laid before that committee—if the Convention directs the appointment of such a committee—and will be carefully considered and put in proper form. It seems to me that it would be unadvisable for us to go into a discussion of these various proposed amendments at the present time.

The SECRETARY.—Mr. Shinn offers six different resolutions. Mr. Fteley suggests that those resolutions be taken up one after the other.

Mr. FTELEY.—The Secretary says just what I meant. I know perfectly well that we are not going to undertake to make any changes in the Constitution now; but there are certain ideas which might be discussed.

The SECRETARY read the first resolution of Mr. Shinn, as follows:

Resolved, That a committee of seven members of this Society be appointed by the President to consider and report upon a systematic revision of the Constitution and By-Laws, so as to afford the Society the best basis for its continued growth and an increased measure of usefulness.

Mr. COHEN.—What is the next?

(The Secretary read the second resolution.)

Mr. SHINN.—I see no objection to following the method proposed by Mr. Fteley, that the resolutions be taken up one by one and voted upon.

Mr. FTELEY.—It seems to me that is the proper way.

Mr. COHEN.—Then, sir, I second the first resolution, for the purpose of bringing it up.

(The Secretary again read the first resolution, as above.)

The CHAIR.—Any remarks on this first part of the resolution? If there is no further discussion we will vote on it.

(Vote taken. Carried.)

The second resolution reads:

Resolved, That all members having suggestions to make upon the subjects referred to the committee, or amendments to offer to the Constitution or By-Laws, be requested to send the same to the Chairman of the Committee.

Mr. J. J. R. CROES.—Is that motion seconded?

A MEMBER.—I second it.

Mr. CROES.—That seems to me entirely superfluous; I should think the committee would attend to that; it simply burdens the minutes uselessly. The first resolution is comprehensive in scope.

Mr. SHINN.—I do not agree with Mr. Croes about that. Under our fundamental law any member may submit an amendment to the Constitution, and the object of specially appointing this committee is so that instead of amendments coming in from a dozen or a hundred different sources, they will all come in through one source. It is merely a request

on the part of this meeting that members shall send their suggestions to the Committee, instead of submitting them directly.

Mr. CROES.—If the gentleman will amend it so that all proposed amendments to the Constitution, submitted before the first of November, be referred to this Committee, it would be proper.

Mr. SHINN.—I do not think we can constitutionally do that. Under the Constitution we cannot deprive any member of his right to send in his amendment in the regular way; all we can do is to make the request.

Mr. FTELEY.—It seems to me that the powers given to that committee are so great that it is not necessary that a resolution be passed to empower them to do certain things. It seems to me that this proposed resolution might be embodied in certain instructions given by the Convention to this committee. It is very proper that when a committee is appointed it should be instructed to do certain things, and in that case the resolution might be made to cover the point more properly.

Mr. J. F. CROWELL.—It seems to me that this action might obviate some difficulty and it might lessen the labor of the committee in advance.

Question called for. The Chair read the second resolution. Vote taken. Carried.

The Chair read the third resolution, as follows:

Resolved, That the committee, if it decide to recommend any amendments to the Constitution or By-Laws, be instructed to present the same, together with the views of the committee upon the same, in the manner and within the time provided for offering such amendments.

Mr. SHINN.—That is as to amendments to the Constitution.

The SECRETARY.—Amendments to the By-Laws may come up at any time. That is so as to insure the possibility, if the committee act, of getting these voted upon within the next year.

Question called for; resolution seconded; vote taken. Carried.

The Chair read the fourth resolution, as follows:

Resolved, That the Board of Direction be requested to have the report of the committee printed and distributed to the members with the proposed amendments.

(Seconded. Carried.)

The Chair read the fifth resolution, as follows:

Resolved, That the committee be authorized to confer with any committees appointed for the purpose by the local engineering societies, with a view of determining whether a satisfactory basis can be established for affiliating therewith.

(Seconded.)

Mr. SHINN.—The object of that resolution is that, if there is to be any such affiliation, it must be provided for in the Constitution, and there is a very decided feeling in many quarters that there ought to be some basis of recognition, on the part of the Society, of the local societies. I do not undertake to advocate the idea of affiliation at this time,

nor, of course, to discuss it. This resolution is simply intended so that the committee may be in a position to provide, in the proposed amendments to the Constitution, for such affiliation, if it is thought desirable and proper.

(Vote taken. Carried.)

The Chair read the sixth resolution, as follows:

Resolved, That the committee make a final report at the next Annual Meeting.

(Seconded; vote taken. Carried.)

Mr. J. G. DAGRON.—I would like to bring up the matter brought up by Mr. Seaman this morning, in a different shape. I would propose the following resolution:

Resolved, That a committee of seven members of this Society be appointed by the President to recommend uniform methods of testing the materials used in metallic structures, and to report such requirements for these materials as, in their judgment, may conduce to further improve the grade of such structures.

There is no doubt there is considerable difference in the methods employed in testing materials used in metallic structures and that these results would be much more valuable if arrived at by certain standard methods of obtaining them. Such recommendations would not be in the nature of a standard specification, but would be, more strictly speaking, recommendations as to what, in the judgment of the committee, would constitute good materials.

(Seconded.)

The CHAIR.—It might be well for the meeting to consider whether the resolution offered by Mr. Dagron comes under the meaning of Section 23, which you have heard read several times, and the clause which I think would be proper to consider is as to whether this can be considered with propriety an engineering subject.

Mr. SHINN.—Will the Chairman rule upon that subject?

The CHAIR.—I have my own views about it, but I would like to have the matter discussed by the members. Unless it is an engineering subject no special committee should be appointed for carrying out the measures proposed in the resolution.

Mr. COHEN.—Mr. President, that resolution calls for a committee to investigate a subject that I suppose appeals to the views and probably to the endorsement of almost every member of the Society; but, under the restrictions which we have already had presented to us in reference to such committees, I do not see how they can be appointed without reference to the By-Law. I shall be prepared to vote, when the time comes, on the adoption of that resolution, but I am inclined to think that we cannot get the committee appointed without just the same formality that has been discussed this morning.

The CHAIR.—We are trying to obtain the views of the Society for the guidance of the Board.

Mr. COHEN.—It seems to me that this is under the same restriction of By-Law 23.

Mr. SEAMAN.—I think the only thing for this meeting to do is to refer this to the Board of Direction. I do not see that we have any other alternative.

The CHAIR.—The resolution will be referred to the Board.

Mr. COHEN.—Mr. President, will it be in order, in view of the resolution recently passed, to appoint a committee on the revision of the Constitution, to introduce an amendment of By-Law 23 now? Would such an amendment take effect at an earlier date than amendments to the Constitution and By-Laws as proposed? If so, if we can bring about some modified working of the by-law, I would offer an amendment which I have prepared.

(The Secretary read from the By-Laws, Section 26.)

Mr. COHEN.—That would carry it over to September or October.

The SECRETARY.—That would carry it over to September, at least.

A MEMBER.—Then it would be subject to revision by the general committee.

Mr. COHEN.—It is hardly worth while.

Mr. CROES.—Is it the desire of the mover of that paper in reference to materials for structures to have an expression of opinion made by this meeting with regard to the propriety of making it a resolution? As was done in the other case, that it is the sense of this meeting that it is proper that such a committee should be appointed; that it was unanimously recommended by this meeting.

Mr. SHINN.—It is certainly within the power of any member to offer a motion of that kind, to be confirmed into a resolution.

Mr. CROES.—I move that in the opinion of this meeting the appointment of such a committee is desirable.

The SECRETARY.—That is, the committee proposed by Mr. Dagon's resolution?

Mr. CROES.—Yes, sir.

Mr. SHINN.—As the question of the desirability of the appointment of the committee is now up for discussion, it seems to me that it would be much more desirable if the proposition contained in Mr. Dagon's submission of a paper could be divided into two. There is, if I recollect the language of it, first a proposition that a committee should be appointed to consider and recommend a uniform system of testing materials for metallic structures, and then there is another and distinct proposition that they shall recommend specifications or qualifications of such metals. Now, those are entirely dissimilar propositions, and if they could be so arranged by the author or architect or designer of the paper in question that a vote could be taken upon them separately, it is

quite possible that the first might be adopted and the second be rejected.

Mr. DAGRON.—I have no objection to the matter being put into shape and made two resolutions, if desirable.

The SECRETARY.—Not two resolutions.

Mr. DAGRON.—No, two propositions. I do not think that the recommendations contemplated would be any more in the nature of specifications than the recommendations of any other committee appointed by the Society as to what would be a desirable form for an engineering feature; for instance, for a rail or anything of that kind. It is simply the expression of the views of the committee.

Mr. JOHN BOGART.—In that connection exactly I must say that the experience of the results of the work of the committee to formulate a standard method of testing cement has shown that it was of very great benefit to the profession. I know, from the very large number of engineers, all over the country and in Canada also, who have written to the Secretary for a copy of the Methods of Testing Cement, saying in their letters that they desired to adopt them for their work, that this has been of the greatest benefit. The work of the committee was merely the formulating a method of testing. As Mr. Shinn recalled to us, that committee did suggest standard strengths. That was stricken out, and I think the fact that it was stricken out has made the work of the committee enormously more useful to us than if it had been left in.

The briquettes that are made now conform so almost entirely to the form recommended by the committee that having, a few weeks ago, five briquettes made in the old form, I had great difficulty in getting machines which would test them. Finally I sent a man up to Troy and he found a couple of old clips in which he tested these briquettes.

But the standard strengths which were suggested by that committee are not the standard strengths of to-day.

Mr. DAGRON.—I have no objection to dividing the resolution as proposed.

Mr. SEAMAN.—Do I understand that is another resolution?

Mr. F. COLLINGWOOD.—Some years ago some of our best engineers were very fixed in their idea that this Society should adopt a fixed standard of weights which should be recommended as the weights for bridges. To-day I think those weights are just about double. We cannot do that in this Society; we must not adopt standards. We have to-day more certain knowledge respecting steel than we had then, and yet any one who reads the Transactions of the Institute of Mining Engineers cannot help seeing that some of the brightest minds of the country are working on that problem, and that we are going to have different conditions from what we have to-day, and the standards we might adopt to-day might be entirely wrong.

The SECRETARY.—The author of the proposed resolution suggests this modification:

Resolved, That a committee of seven members of this Society be appointed by the President to recommend uniform methods of testing the materials used in metallic structures.

Resolved, That the same committee be requested to report such requirements for these materials as, in their judgment, may conduce to further improve the grade of such structures.

Mr. SHINN.—I would suggest to the author that a vote be taken separately on the two resolutions, by letter-ballot.

Mr. CROES.—I move that this meeting recommend the adoption of this first motion.

Mr. SEAMAN.—It seems to me that this is an unnecessary step.

Mr. SHINN.—It is what we have always done.

Mr. SEAMAN.—It is what you refused to do this morning.

Mr. CROES.—The question now is on the adoption of the motion I offered. (Seconded.)

The CHAIR.—Any remarks on Mr. Croes' resolution?

Mr. SEAMAN.—I do not understand just how we are better able now to vote upon that question than we shall be by ballot, and how we, as a small meeting here, are able to advise those who are not present any more than we were this morning.

(Question called for. Carried.)

The SECRETARY read the second part of Mr. Dagron's motion as above.

Mr. COLLINGWOOD.—I move that the sense of this meeting be that this resolution be not adopted. (Seconded.)

The CHAIR.—It is moved and seconded of the part just now read, that the sense of this meeting be opposed to the adoption of that part of the resolution.

Mr. CROES.—I call for a count on that question.

The CHAIR.—On both resolutions?

Mr. CROES.—The first was carried.

The CHAIR.—The first was unanimous.

Rising vote taken. Nineteen in favor of the motion (against adopting the resolution); one opposed.

Mr. C. C. SCHNEIDER asked for information. The Secretary read the resolution and explained the matter to Mr. Schneider, who then wished to be counted in the negative. Two opposed.

The SECRETARY.—There are thirty-four members present.

The CHAIR.—Twenty-one have voted, at least thirteen not voting.

The SECRETARY (to the Stenographer).—Make the record nineteen in the affirmative, two in the negative, and thirteen present and not voting.

The CHAIR.—Any further business?

Mr. SEAMAN.—I think this is doing just what Mr. Croes said this morning the By-Laws were made to avoid. It is an expression of opinion by this meeting which is going to kill a motion.

Mr. COLLINGWOOD.—That is just what we wanted to do.

Mr. SEAMAN.—I understood that provision was made in the By-Laws in order to avoid an action of just this kind.

Mr. CROES.—Not to avoid an expression of opinion, but to avoid the killing of a motion by a few men.

The CHAIR.—Any further business?

On motion, the business meeting of the Society, held during the Convention, adjourned to July 3d, for the purpose of then canvassing the current ballot for membership.

The session of the Convention was resumed, Mr. J. J. R. Croes taking the chair again.

The SECRETARY asked whether it was the desire of the members present that presentation and discussion of papers should proceed this afternoon, or whether they wished an adjournment to visit the Long Branch Water Works.

Mr. BRUSH.—I think it would be far better that we should adjourn until to-morrow morning at 10 o'clock.

On motion, the Convention adjourned to June 25th, at 10 o'clock.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Election.
GAY, MARTIN.....	(Elected Junior, June 4, 1884.) Assistant Engineer Dept. Public Works, City of New York, West New Brighton, Richmond Co., N. Y.....	June 5, 1889
HALL, JULIEN ASTIN.....	First Assistant Engineer Rich- mond and Danville R. R., Washington, D. C.....	June 5, 1889
NEARING, FRANK.....	Brown, Howard & Co., Tarry- town, N. Y.....	June 5, 1889
PIERSON, GEORGE SPENCER....	Kalamazoo, Mich.....	June 5, 1889
STARR, ARTHUR BURR.....	Superintendent Eastern Div. Pennsylvania R. R., Alle- gheny, Pa.....	June 5, 1889

ASSOCIATES.

BREUCHAUD, JULES.....	204 West One Hundred and Twenty-first st., New York City.....	June 5, 1889
-----------------------	---------------------------------------------------------------------	--------------

FUTAMI, KIOSABURO.....	Keith and Perry Building, Kansas City, Mo.....	June 5, 1889
HAZEN, JOHN VOSE.....	Dartmouth College, Hanover, N. H.	June 5, 1889
HUNSIKER, MILLARD	Carbon Iron Co., Pittsburgh, Pa.....	June 5, 1889

JUNIORS.

CUSHING, WILLIAM CHANNING...	Engineer Maintenance of Way, Cincinnati and Muskingum Valley Ry., Zanesville, Ohio.	June 5, 1889
LAWLOR, THOMAS FRANCIS....	Resident Engineer Eastern and Western Approach, Pough- keepsie Bridge, Poughkeepsie, N. Y.....	June 5, 1889
SMITH, MERRITT HAVILAND, JR.	Assistant Engineer Croton Aqueduct, P. O. Box 767, Yonkers, N. Y.....	June 5, 1889

CHANGES AND CORRECTIONS.

MEMBERS.

ANNAN, CHARLES L.....	Assistant City Engineer, St. Paul, Minn.
COWLES, WALTER L.....	Engineer Youngstown Bridge Co., Youngstown, Ohio.
FLAD, EDWARD.....	Civil and Mechanical Engineer, Laclede Build- ing, St. Louis, Mo.
GERBER, EMIL.....	With George S. Morison, The Rookery, Chi- cago, Ill.
HERING, RUDOLPH	277 Pearl st., New York City.
HOAG, SIDNEY W., JR.....	1718 Madison ave., New York City.
HUNT, RANDELL	Chief Engineer San Francisco Contracting Co., 1001 Pine st., San Francisco, Cal.
JACKSON, JONES M.....	Chief Engineer for Godeffroy & How, Con- tractors Baltimore and Eastern Shore R. R., Easton, Md.
ROBINSON, ALBERT F.....	(Care E. L. Corthell), 205 La Salle st., Chicago, Ill.
RUSSELL, NATHANIEL E.....	580 First ave., Lansingburgh, N. Y.
WALKER, WILLIAM W.....	General Manager Tucson, Globe and Northern R. R., 11 Wall st., New York City.
WASHBURN, FRANK S	143 Forty-seventh st., Chicago, Ill.
WETHERILL, WILLIAM C.....	General Manager Empire Zinc Co., Joplin, Mo.

ASSOCIATE.

BARNES, WILLIAM H.....	President and Receiver Allegheny Valley R. R., 234 South Fourth st., Philadelphia, Pa.
------------------------	-------------------------------------------------------------------------------------------

JUNIORS.

BELL, GILBERT J.....Sibley, Mo.

HAINES, GASPAR W.....Cheltenham, Pa.

HORTON, SANDFORD.....(Care Y. N. and S. W. Ry.), Yankton, South
Dak.

MOULTHROP, GEORGE E.....(Ray & Moulthrop), Butte, Mont.

July, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JULY 3D, 1889.—At an adjourned session of the meeting of June 24th, held at New York, July 3d, 1889, ballots were canvassed and the following candidates declared elected. As Members: Waldo Emerson Buck, Lake Village, N. H.; William Howard Courtenay, Montgomery, Ala.; Rob Benjamin Davis, Pencoyd, Pa.; Louis Hyde Evans, Chicago, Ill.; Joachim Godtske Giaver, Pittsburgh, Pa.; Edward Gillette, Jr., New Haven, Conn.; Paul Sourin King, New York City; William Rufus Northway, Chicago, Ill.; Samuel Harrison Smith, San Francisco, Cal.; Benjamin Thompson, Chattanooga, Tenn. As Associates: Julius I. Livingston, Bound Brook, N.J.; Thomas Spencer Miller, New York City. As Juniors: Norman Smith Latham, Brooklyn, N. Y.; Ludwig Paul Wolfel, Pencoyd, Pa.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

	Date of Election.
COURTENAY, WILLIAM HOWARD.....Assistant Engineer Southern Division L. and N. R. R., Montgomery, Ala.....	July 3, 1889
DAVIS, ROBERT BENJAMIN.....Manager Bridge and Construction Department Pencoyd Iron Works, Pencoyd, Pa.....	July 3, 1889
EVANS, LOUIS HYDE.....Division Engineer Chicago and Northwestern R. R., Chicago, Ill.....	July 3, 1889
GILLETTE, EDWARD, JR.....123 Columbus Avenue, New Haven, Conn.....	July 3, 1889
KING, PAUL SOURIN.....Chief Engineer Buffalo and Geneva R. R., 284 Main street, Buffalo, N. Y.....	July 3, 1889
NORTHWAY, WILLIAM RUFUS.....City Engineer, Chicago, Ill.....	July 3, 1889
THOMPSON, BENJAMIN.....Room 65, Richardson Block, Chattanooga, Tenn.....	July 3, 1889

ASSOCIATES.

LIVINGSTON, JULIUS I.....	Manager Standard Paint Co., Bound Brook, N. J.....	July 3, 1889
MILLER, THOMAS SPENCER.....	96 Liberty Street, New York City.....	July 3, 1889

JUNIOR.

WOLFEL, LUDWIG PAUL.....	Pencoyd Bridge and Construc- tion Co., Pencoyd, Pa.....	July 3, 1889
--------------------------	------------------------------------------------------------	--------------

CHANGES AND CORRECTIONS.

DODGE, JOSEPH T.....	Madison, Wis.	
GATES, HORACE D.....	Deputy City Engineer, 515 Derisadero street, San Francisco, Cal.	
GERBER, EMIL.....	With George S. Morison, Room 1120, The Rookery, Chicago, Ill.	
GRANT, WILLIAM H.....	Assistant Architect New Naval Observatory, Georgetown Heights, D. C., 1828 Jefferson Place, Washington, D. C.	
HERBERT, ARTHUR P.....	Woodbury, N. J.	
HOLBROOK, FREDERICK W. D....	Manager Seattle, Lake Shore and Eastern Ry., Seattle, Wash.	
MARR, GEORGE A.....	U. S. Assistant Engineer, U. S. Engineer's Office, 1515 Lucas Place, St. Louis, Mo.	
MORISON, GEORGE S.....	Room 1120, The Rookery, Chicago, Ill.	
MORRIS, MARSHALL.....	People's Bank, Louisville, Ky.	
PEARY, ROBERT E.....	Civil Engineer U. S. N., U. S. Navy Yard, League Island, Pa.	
SCHUYLER, JAMES D.....	Commissioner of Public Works, San Diego, Cal.	

ASSOCIATES.

HARRIS, CHARLES M.....	35 Liberty street, New York City.	
WARDER, JOHN H.....	Athens, Pa.	

JUNIORS.

BOOKER, BERNARD F.....	(Care J. Steffan), Virginia City, Neb.	
FISHER, ELSTNER.....	Assistant Engineer Michigan Central R. R., 1133 Woodward avenue, Detroit, Mich.	
MODJESKI, RALPH.....	(Care George S. Morison), Room 1120, The Rookery, Chicago, Ill.	
TACHARD, ANDRE P.....	13 Rue Tronchet, Paris, France.	
WHEELER, HARRY R.....	Engineer in charge Tunnel, etc., N. Y., O. and W. Ry., Walton, N. Y.	

WILLIAMS, WILLIAM P.....7 West 31st street, New York City.

WOOD, CHARLES F.....First Assistant Engineer in charge of Sewer
Work, City Hall, Raleigh, N. C.

DEATH.

LYON, WILLIAM M.....Elected Fellow March 23d, 1870; died July
3d, 1889.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV, August, 1889.

No meetings of the Society were held during August, 1889.

MEMOIRS OF DECEASED MEMBERS.

GEORGE DOANE ANSLEY, M. Am. Soc. C. E.

DIED SEPTEMBER 15TH, 1883.

George Doane Ansley was born in the City of Montreal, Canada, December 2d, 1836. He was the youngest son of the Rev. Amos Ansley, of Hull, Province of Quebec, but his early life was spent in the city of his birth, where his education was carried to the extent of graduation from the high school. With this for a foundation he commenced his special training for the profession of civil engineering in what is now the Province of Ontario. His first experience in the field was as a rodman upon the construction of the Port Hope and Lindsay Railway, in 1859. In the two succeeding years he was employed upon Government and municipal surveys in various capacities, and was in charge of a party at the time of his withdrawal to accept the position of Principal Field Assistant to Messrs. Plunkett & Brady, Engineers and Surveyors, in general practice in Montreal. This engagement continued from 1862 to 1866, when he turned his attention to commercial pursuits. After two years of business life he resumed the practice of his profession, being engaged as First Assistant Engineer on the survey and construction of the Quincy, Missouri and Pacific Railway, where he surveyed 125 miles of road, and located and constructed a short section.

Following this he was employed during the year 1870 as Assistant Engineer upon the construction of the Keokuk and Hamilton Bridge over the Mississippi River. In November, 1870, he became General Superintendent of the Union Screw and Bolt Company's works at Chicago, but the Company being forced to close its affairs in 1872, by reason of the burning, for the second time, of its manufactory, Mr. Ansley accepted the General Management of the North Western Car Spring Works, which closed in June, 1873. In September of that year he was called to Montreal to assume the duties of Assistant Engineer on the staff of that city. In August, 1875, he was promoted to Deputy City Surveyor and Acting Chief in charge, followed by his appointment in July, 1876, to the position of City Surveyor and Engineer in charge of roads, parks and sewers, in which capacity he served with faithfulness and distinction until his death.

While making a professional visit to the Mount Royal Park, on September 15th, 1883, he was thrown from his horse with such violence as to fracture his skull, from which injury he died on September 22d, 1883, in the forty-seventh year of his age.

Mr. Ansley became a member of the American Society of Civil Engineers September 4th, 1878.

Mr. Ansley was a careful and able engineer, and possessed a warm-hearted, generous, obliging nature which won the friendship of all who were brought into business or social relations with him. The esteem in which he was held in his native city is commemorated by resolutions of regret and condolence to his wife and four children who survive him, passed by the City Council and by the members of the press of Montreal.

GEORGE HARFORD ELLIOTT, M. Am. Soc. C. E.

DIED OCTOBER 7TH, 1886.

Mr. George H. Elliott was born at Lancashire, England, October 2d, 1842. While yet a boy he came to this country, and catching the national spirit, espoused the cause of the Union, serving in the Federal army through the recent civil war. His connection with the army did not, however, cease with the fall of Richmond. He was engaged as Assistant Engineer in the construction of Fort Wool, Virginia, and also in the repair and preservation of Fort Monroe, Virginia.

From 1870 to 1874 Mr. Elliott's chief duties were in connection with the improvement of several of the rivers of the Atlantic coast, with a short intermission during a part of the years 1872 and 1873, when he had the supervision of modifications then being made in Fort Monroe. With the exception of a short time, during which he was detailed for

special duties under the auspices of the Quartermaster's Department of the Army, he was in immediate charge of river and harbor improvements in Virginia and North Carolina, being stationed at Norfolk, Va.

He was highly respected, both as an engineer of acknowledged ability, and as a gentleman of courteous manner and kind heart. He had a large circle of acquaintance in the South, where he was widely known through his connection with works for the improvement of navigation, and where he is also remembered with feelings of warmest friendship by many who had the good fortune to know him intimately.

He entered the American Society of Civil Engineers as a member on April 4th, 1883.

Mr. Elliott was only in the prime of life—forty-four years of age—when he was suddenly stricken down by a congestive chill, October 7th, 1886.

WILLIAM L. BAKER, M. Am. Soc. C. E.

DIED MAY 28TH, 1888.

William L. Baker was born June 16th, 1850, at Toledo, O., being the eldest son of William Baker, the well known lawyer of that city. He early showed a predilection for mechanics, and his education was turned in that direction. He was graduated in 1871 at the Rensselaer Polytechnic Institute at Troy, N. Y. Immediately thereupon he entered briskly into professional duty. He was Assistant Engineer under Colonel E. D. Mason, M. Am. Soc. C. E., in the construction of the bridges over the Mississippi River at Hannibal, Mo., and subsequently of the bridge over the Missouri River at St. Joseph, Mo. His work there was of a character to attract the attention of the Managers of the Detroit Bridge and Iron Works, who were the contractors for those bridges, and in 1872 he entered the service of that company at Detroit, Mich., where he remained so long as he lived. Beginning in a subordinate capacity, his merits proved to be such that he was advanced step by step until he became Superintendent and Engineer of the entire establishment.

During the sixteen busy years of his life work with that company he designed and superintended the construction of a great number of iron bridges and roofs, and works of similar character, the uniform excellence of which bears witness to his professional ability. One can hardly ride over any of the railways of the Northwest without crossing some of his bridges.

With a keen analytical mind and a broad substratum of solid good sense, he was a hard student, and was devoted soul and body to his

work. He rejoiced in it and his principal pleasure was always found in it. Among his other qualifications he developed an excellent executive ability. He had the faculty of handling men, was a good judge of human nature, and succeeded well in the general management of affairs. His life work was just fairly opening, broad and full, before him, when, at the age of thirty-eight years, he was called upon to lay it all down. The immediate cause of his death was consumption.

But Mr. Baker was not solely an engineer. He was eminently of a social nature. Of warm heart, and winning, kindly manner, he always attracted people, and those who began as mere acquaintances, always, if intercourse was sufficiently prolonged, grew into attached comrades. Few young men had a larger list of warm and affectionate friends.

He was married in 1879 to Miss Kate Mead, of Lockport, N. Y., who, with two children, survives to mourn his loss.

He joined the American Society of Civil Engineers as Junior January 6th, 1875, and was made full member November 6th, 1878.

In his death our Society and the profession have lost a most worthy and promising member, and many fond hearts will long regret his early taking off.

NATHANIEL WEBSTER ELLIS, M. Am. Soc. C. E.

DIED JANUARY 16TH, 1889.

Some men challenge admiration simply by the possession of talent, or by the performance of notable feats in the line of their respective callings. Others, again, in addition to natural ability and acquired attainments, carry with them a spirit of good fellowship, such that one forgets to estimate them according to common standards, but accept them, without questioning their capabilities, as worthy of all the confidences of friendship. Nathaniel W. Ellis was a man of this kind—one in whom an unusually strong individuality was developed with that sweetness of nature whose power to awaken instant responsive sympathy in others is denominated "personal magnetism." This quality, all who knew him will attest, was possessed by Mr. Ellis in an eminent degree. Some unusual traits of character also are shown by the following tribute by a fellow townsman: "If he ever took offense scarcely any one knew it, and to hear him speak illy or slightly of anybody was of such rare occurrence, that many of his most intimate friends can recall no such instance. He was kind, honest, sincere and whole-souled; a friend in whose company there was brightness, sunshine and congeniality; in business he was able and upright." His death was

mourned as a public misfortune, as well as a personal sorrow to each citizen in Manchester, N. H., which city he had made the home of his adoption.

Mr. Ellis was born in the Village of Amesbury, Mass., in the year 1849. His father, removing to New York, amassed a considerable fortune, which enabled him to give his son the advantage of an excellent education. He must have been a precocious boy, for we hear of him as a baccalaureate from the Norwich University at the age of nineteen, and already manifesting so decided a propensity toward civil engineering that it was at once determined upon as his profession, and he began the study of it under Mr. James A. Weston, of Manchester, N. H. While here he was fortunate enough to have experience in railroad location and construction on the Suncook Railroad in New Hampshire, and he later became engineer in charge of a division on the Sugar River Railroad. The unusual talent he displayed is evidenced by his appointment, at the age of twenty-one, to a position on the corps of engineers engaged under Henry Meiggs upon the construction of the railroad from Arequipa to Puno, in Peru. This engagement lasted three years, before the termination of which his ability received further recognition, he having intrusted to his charge the construction of a 20-mile section of this road, in which was included the Sumbay Bridge.

Returning to the United States in 1874, he was engaged for a short time upon the Boston Water-works. He then settled in Manchester, N. H., where he opened an office, and entered upon general practice, forming a partnership in 1876 with Mr. Wallace Patterson. At one time he surveyed over portions of the Union Pacific and Central Pacific Railroads in the interest of Mr. C. P. Huntington; but the larger part of his work consisted in the construction of water-works, a branch of the profession in which Mr. Ellis was acquiring a wide reputation. He was connected with the building of water-works plants for Haverhill, Mass., Lisbon, Littleton, Laconia, and other places in New Hampshire. He also at one time did the engineering work for the City of Manchester, and is remembered as one of the active spirits in the establishment there of the People's Gas Light Company.

His death, which occurred at the Boston City Hospital on January 16th, 1889, was the remote effect of a severe bruise upon the head, which caused a disease of the bone, ending in inflammation of the brain.

Mr. Ellis became a member of the American Society of Civil Engineers February 2d, 1881.

EDWARD BAUMANN, Assoc. M. Am. Soc. C. E.

DIED JANUARY 26TH, 1889.

Edward Baumann was born near Dantzic, Prussia, August 18th, 1838, and was a son of Albert Baumann, a leading merchant of that city. He was given a liberal education, completing his literary and preparatory course at the age of fifteen, when he entered the polytechnic school at Graudenz, from which he graduated in 1856. Immediately following this he came to America, and in the spring of 1857 arrived at Chicago, and entered the office of Burling & Baumann, architects (the latter partner of which was a relative of his), with whom he remained several years. In 1860, Mr. Baumann went to Memphis, Tenn., where he began the practice of his profession on his own account. The breaking out of the Civil War in the following year caused him to leave the South and to return to this city, where he has since resided. In 1868, Mr. Baumann married Miss Elise Steinbauer, a native of Prussia, and a lady of rare culture and worth. Mr. Baumann has been eminently successful in his professional work, and he has been likewise highly esteemed both as a man and a citizen, and many friends mourn his death. Among the memorials now standing of his labors may be mentioned the Metropolitan Block, the Ashland Block, the McCormick Reaper Factory, and many other large business blocks and fine residences in Chicago, and he was also the architect employed in remodeling the old Chamber of Commerce to a 14-story office building. Mr. Baumann was frequently engaged as an expert in figuring the safety of foundations and upper structures from other architects' plans, as for the new Board of Trade Building. In 1879, Mr. Baumann associated with William H. Lotz, M. Am. Soc. C. E., under the firm name of Baumann & Lotz, for the erection of Grain Elevators, Malt-houses and Breweries, and jointly they built Armour, Dole & Company's Elevator *D* with annex, having a storing capacity of 3 000 000 bushels, Rock Island Elevator *A*, and many smaller houses, and they also furnished plans for a large grain elevator to be built for the New York, West Shore and Buffalo Railroad, at Weehawken, N. J. They built the first pneumatic malt house, Saladin system, for the L. C. Huck Malting Company, and the new brew house for the P. Schoenhofen Brewing Company, of Chicago.

From overwork, Mr. Baumann, in the spring of 1888, contracted a nervous disease which greatly affected his eyes, and upon recommendation of his physicians, on July 7th, 1888, he went to Europe with his family, and in Berlin had an operation performed on one of his eyes which was successfully carried through. Then, going to Wiesbaden

for further improvement, Mr. Baumann caught a bad cold, which settled upon his liver, and he died from a tumor of the liver at Berlin, on the 26th day of January, 1889, after a very painful illness. On the 29th of January his remains were cremated at Gotha, Saxony, this having been his desire.

Mr. Baumann leaves behind him his widow, and two children—a daughter, Miss Lettie Baumann, and a boy, Edgar B., of about thirteen years of age.

Mr. Baumann became an Associate of the American Society of Civil Engineers June 2d, 1880, and took an active interest in its proceedings, particularly while attending the Conventions held at St. Louis and at Denver.

ADDITIONS TO LIBRARY AND MUSEUM.

- From David E. Allen, West Chester, Pa.:
West Chester, Pennsylvania; its Industrial and Commercial Resources. Illustrated.
- From American Institute of Mining Engineers. Dr. R. W. Raymond, Secretary, New York City:
Some Thoughts and Suggestions on Technical Education. T. Egleston.
Notes on the Topography and Geology of Western North Carolina. The Hiawassee Valley. Henry E. Colton.
Petroleum and Natural Gas in New York State. Charles A. Ashburner.
Some Recent Improvements in Open Hearth Steel Practices. Alfred E. Hunt.
Notes on the Topography and Geology of the Cerro de Pasco, Peru. A. D. Hodges.
The Blake System of Fine Crushing and its Economic Results. Theodore A. Blake.
Calculations of the Available Heat and the Required Dimensions of Chimneys, Combustion Chambers and Gas Burners in the Use of Blast Furnace Gases for Firing Boilers. Frank C. Roberts.
Systems of Mining in Large Bodies of Soft Ore. Richard P. Rothwell.
The Electric Motor in Mining Operations. George W. Mansfield.
A Water Manometer and Anemometer. J. M. Silliman.
Geological History of the Yellowstone National Park. Arnold Hague.
A Description of the Plant of the Boston Heating Company. Arthur V. Abbott.
Methods of Mining in the Menominee Range, Michigan. John Fulton.
The Cost of a Ton of Pig Iron in the Sequachee Valley. William M. Barrow.
Biographical Notice of Byron W. Cheever. William H. Pettee.
Method of Constructing Strata-Maps to Represent Stratification or Bedding. James T. Ives.
Structural Relations of Ore Deposits. S. F. Emmons.
- The New York Mining Law. R. W. Raymond.
Note on Arsenic Determinations. R. C. Cauley.
An Aluminium Ore. Edward Nichols.
Efficiency of a Steam Boiler Using the Waste Gas of a Blast Furnace as Fuel. D. S. Jacobus.
Henderson Steel. Alfred F. Brainerd.
Map of Western North Carolina and Northeast Georgia, showing positions of Geological and Water Divides, and the peculiar Topography of the Western North Carolina Mountain Region.
Proceedings of the Fifty-first Meeting, Birmingham, Ala., May, 1888.
The Russell Process in its Practical Application and Economic Results. Ellsworth Daggett.
Twenty Years' Progress in the Concentration of Sulphuric Acid. W. H. Adams.
Western Kentucky Coals and Cokes. Joseph H. Allen.
Spirally Welded Tubing. J. C. Bayles.
Modes of Occurrence of Pyrite in Bituminous Coal. Amos P. Brown.
Certain Conditions in the Manufacture of Steel Rails which may Greatly Influence their Life in Service. Frederic A. Delano.
Note on a New Device for Operating Blast Furnace Charging Bells. Frank Calvin Roberts.
Trough Lixiviation. Ottokar Hofmann.
An Improved System of Water Supply for Hydraulic Mining. H. D. Pearsall.
Mode of Deposition of the Iron Ores of the Menominee Range, Michigan. John Fulton.
The Bedded Ore Deposits of Red Mountain Mining District, Ouray County, Colorado. G. E. Kedzie.
Husgafvel's Improved High Bloomery for producing Iron and Steel Direct from Ore. F. Lynwood Garrison.
Concentrating Magnetite with the Conkling Jig at Lyon Mountain, N. Y. Fred. S. Ruttmann.

- Proceedings of the Fiftieth (Annual) Meeting, Boston, Mass., February, 1888.
- List of Officers, Members, etc., May, 1888.
- Large Furnace on Alabama Material. Fred. W. Gordon.
- The Losses in Roasting Gold Ores and the Volatility of Gold. Samuel B. Christy.
- Notes on the Geology and on some of the Mines of Aspen Mountain, Pitkin Co., Colo. Carl Henrich.
- Phosphate Slag. William B. Phillips.
- The Grading of Birmingham Pig Iron. Kenneth Robertson.
- The Petite Anse Salt Mine. Richard A. Pomeroy.
- Mining in Soft Ore Bodies at Low Moor. W. S. Hungerford.
- The Feasibility of Using Cheaper Fuels in the Blast Furnace. Jacob T. Wainwright.
- Determination of Phosphorus in Iron and Steel. Porter W. Shiner.
- Anthracite and Coke, separate and mixed, in the Warwick Blast Furnace. Edgar S. Cook.
- Notes on the Iron Ores, Fuels, and Improved Blast Furnace Practice of the Birmingham District. Alfred F. Brainerd.
- The Glenmore Iron Estate, Greenbrier County, West Virginia. William N. Page.
- Note on a Specimen of Gilsonite from Uintah County, Utah. R. W. Raymond.
- The Development and Statistics of the Alabama Coal Fields for 1887. Charles A. Ashburner.
- Petroleum and Natural Gas in New York. C. A. Ashburner.
- Asphalt and its Uses. F. V. Greene.
- The Impurities of Water. A. E. Hunt and George H. Clapp.
- Steel Rails and Specifications for their Manufacture. Robert W. Hunt.
- The Mining Industry in its Relation to Forestry. B. E. Fernow.
- Ferro-Silicon and the Economy of its Use. W. J. Keep and Edward Orton, Jr.
- The Chlorination of Low-Grade Auriferous Sulphides. William B. Phillips.
- The Northwestern Colorado Coal Region. G. C. Hewett.
- The Minerals of Ontario and their Development. William Hamilton Merritt.
- Large Furnaces on Alabama Material.—Discussion. Frederick W. Gordon.
- Hot Spring Formations in Red Mountain District, Colorado District. A Reply to the Criticisms of Mr. Emmons. Theodore B. Comstock.
- Note on Cast-Steel Water Jackets. Richard H. Terhune.
- The Flue-Dust of the Furnaces at Low Moor, Va. Ellison C. Means.
- Cement Rock and Gypsum Deposits in Buffalo. Julius Pohlman.
- A Differential Regenerative Hot Blast Stove and its Application to an Open Hearth Blast Furnace. Jacob T. Wainwright.
- Notes on the Roasting of the Hudson River Carbonates. Ingersoll Olmsted.
- Water Gas as a Steam Boiler Fuel. D. S. Jacobus.
- The Equalization of Load on Winding Engines by the Employment of Spiral Drums. E. M. Rogers.
- Soaping Geysers. R. W. Raymond.
- The Effect of Velocity and Tension of Gases on the Reduction of Ores in the Blast Furnace. Theodore W. Robinson.
- Notes on the Rosario Mine at San Juancito, Honduras. C. A. Thomas H. Leggett.
- The Life History of Niagara. Julius Pohlman.
- Proceedings of the Fifty-second Meeting, Buffalo, N. Y., October, 1888.
- Contents and Index, Vols. I to XV, inclusive.
- Transactions, Vol. XVI, May, 1887, to February, 1888, inclusive.
- From American Frost Meter Company, Boston, Mass.:
Meter Tables giving number of United States gallons for each cubic foot from 1 to 1000 000. George A. Ellis, Boston, 1888.
- From American Society of Mechanical Engineers. F. R. Hutton, Secretary, New York City:
Transactions, Vol. IX, 1888.
- From William H. Bailey, New York City:
Description of Rice's Patent Feed Water Heater and Purifier with Pump combined.
- From Bites and Kimball, Boston, Mass.:
Technology Architectural Review, Vol. 1, Nos. III, IV, V, VI and VII.
- From Onward Bates, Milwaukee, Wis.:
General Specifications for Wrought-Iron and Steel Structures, July 1st, 1888.
- From Professor Arthur Beardsley, Swarthmore, Pa.:
Aperçu de Quelques Difficultés A vaincre dans La construction du Canal de Panama. Le Dr. Wolfred Nelson, Paris, 1887.
- From General S. V. Benét, Chief of Ordnance, U. S. Army, Washington, D. C.:
Annual Report of the Chief of Ordnance to the Secretary of War for the fiscal year ended June 30th, 1887.
- Ordnance Notes, No. 43. The Minimum Caliber or the Infantry Weapon of the Future. Professor Frederick Wilhelm Heller.
- Ordnance Notes, No. 45. The Cellular Theory of Steel.
- Ordnance Notes, No. 46. On the Erosion of Gun-Barrels by Powder Products. Sir Frederick Abel.
- Ordnance Notes, No. 47. Probability of Fire. Lieutenant William Crozier.
- Index of Ordnance Notes, Nos. 1 to 357, inclusive, Vols. I to XIII.
- From George H. Benzenberg, Milwaukee, Wis.:
Annual Report of the Board of Public Works of Milwaukee, Wis., for the years 1882, 1883, 1887.
- From Walter G. Berg, Perth Amboy, N. J.:
Two Photographs of Specimens of Wood Treated with Fernaline or Wood Creosote Oil, also with Coal Tar Creosote (Dead Oil or Tar).
- From John S. Billings, Surgeon-General U. S. A., Washington, D. C.:
Index Catalogue of The Library of the Surgeon-General's Office United States Army. Vol. IX, 1888.
- From John Birkinbine, Philadelphia, Pa.:
Report on the Water Power of the St. Louis River.

From the Board of Trade of Grand Rapids, Mich.:
Grand Rapids, Michigan, as it is. Published by the Board of Trade.

From the Board of Supervisors, San Francisco, Cal.:
San Francisco Municipal Reports for the fiscal year 1887-88, ending June 30th, 1888.

From Hon. John Bogart, New York City:
Thirtieth Annual Report of the Trade and Commerce of Chicago for the year ended December 31st, 1887.

Annual Report of the State Engineer and Surveyor on the Canals of New York for the fiscal years ending September 30th, 1885 and 1887; also Maps of Report of State Engineer on Canals.

Nineteen Maps of the Adirondack Wilderness and adjoining Territory.

From W. W. Bonnett, Waterbury, Conn.:
Twenty-first Report of the Board of Water Commissioners of the City of Waterbury for the year ending December 31st, 1887.

From Brooklyn Library, Adrian Van Sinderan, Secretary:
The Thirtieth Annual Report of the Board of Directors of the Brooklyn Library.

From Otto Carl Edward Budde, Essen, Germany:
Ueber das Durchschlagen von Panzerplattens Erste Folge, Essen, 1888.

From Bureau of Education, Washington, D. C.:
Industrial Education in the South, by Rev. A. D. Mayo, Washington, 1888.

Proceedings of the Department of Superintendence of the National Educational Association at its meeting at Washington, March 15th-17th, 1887.
Report of the Commissioners of Education for the years 1886-87.

From Bureau of Navigation, Navy Department, Washington, D. C.:
Pilot Chart of the North Atlantic Ocean for May, June, July, August, September, October, November, December, 1888; January, February, 1889; and Supplement to the Chart for August, 1888, showing reports of Logs from the Great Raft and Timber from Vessels' Deck Loads; also Supplement to the Chart for February, 1889, referring to the Derelict American Schooner *W. L. White*, together with the Tracts of three other notable Derelicts and the General Drift of Ocean Currents.

From Bureau of Pensions, Washington, D. C.:
Annual Report of the Commissioner of Pensions for 1888.

From Bureau of Statistics, Washington, D. C.:
Technical Education in Europe. First Part. Industrial Education in France. J. Schoenhof.
Statistical Abstract of the United States, 1887. Tenth Number.

Reports from the Consuls of the United States, Nos. 90, 91, 92, 93, 94, 95, 96, 97, 98, 99 and 100, March, April, May, June, July, August, September, October, November and December, 1888.

Budgets and Budget Legislation in Foreign Countries, No. 90, March, 1880.

From the Canadian Institute. Alan Macdugal, Secretary. Toronto, Canada:
Annual Report of the Canadian Institute, Session 1886-87, being part of Appendix to the Report of the Minister of Education. Ontario, 1887.
Proceedings. Third Series. Vol. V. 1886-87.

From Robert Cartwright, Rochester, N. Y.:
The Prall Patents for Central Station Heating and Power Supply by the Use of Superheated Water. Address by A. V. Abbott, C. E., before the Boston Society of Civil Engineers.

From Gen. Thomas Lincoln Casey, Chief of Engineers, Washington, D. C.:

Advertisements, Specifications and Proposals, as follows:

For Improvement of Black Warrior River, Alabama:

For Furnishing One Dredge and One Tug; for Improving Clinton River, Michigan.
For Constructing a Steam Propeller.

For Wrought-Iron Work.

For Hoisting Engines.

For Furnishing one Dredge, one Tug and two Dump Scows for Removing Shoals in and around the Harbor of Refuge, Sand Beach, Michigan.

For Dimension Stone.

For Reconstruction of the Aqueduct Bridge, D. C.

For Timber.

For Constructing Dike near Mifflin Bar.

For Iron Drift Bolts.

For Constructing Dike at Reedy Island.

For Cement.

For Timber, Iron and Stone.

For Constructing Breakwater at Agate Bay, Minnesota.

For Improving Entrance to Humbolt Bay, Cal.

For Pier Construction in front of Fort Brady, at Saint Mary's Falls Canal, Michigan.

For Building Dam at Paradise Cut, on the San Joaquin River, Cal.

For Repairing Snagboat.

For Four Model Barges, North Columbia River, Oregon.

For Removal of Ledge from Manchester Harbor, Mass.

For Improving Cambridge Harbor, Maryland.
For Removal of Ledge from Hingham Harbor, Mass.

For Improvement of Ice Harbor at Marcus Hook, Pa.

For Pier Extension and Superstructures at Ontonagon, Michigan.

For Lumber for Improving Harbor at New Orleans, La.

For Improving Harbor of Duluth, Minnesota.
For Improvement of Oakland Harbor, California.

For Poles and Brush for Improving Harbor at New Orleans, La.

For Improvement of Wilmington Harbor, California.

For the Delivery of Granite Ashlar at Gallop's Island, Boston Harbor, Mass.

For Repair of Delta Point, La.

For Improving Mississippi River, Lake Providence Reach.

- For the Delivery of Stone and Brush for Provincetown Harbor, Mass.
 For Cement, Stone, and Pebbles.
 For Hard Times—Wilson Levee, Tensas Parish, Louisiana.
 For Removal of Wrecks from St. John's River, Florida.
 For Improving Choptank River, Maryland.
 For Improving Mississippi River, Lake Bolivar Front.
 For Improving Duck Creek, Delaware.
 For Improving St. John's River, Florida.
 For Dredging Saginaw River, Michigan.
 For Dredging in Lynn Harbor, Mass.
 For Dredging in Wellfleet Harbor, Mass.
 For Dredging Approach to Norfolk Harbor and U. S. (Norfolk) Navy Yard, Va.
 For Dredging in Harbor at Norfolk and its Approaches, Va.
 For Dredging in Boston Harbor, Mass.
 For Dredging in the Harbor at Grand Marais, Minnesota.
 For Dredging in Scituate Harbor, Mass.
 For Dredging in Superior Bay and St. Louis Bay, Wisconsin.
 For Dredging in Biloxi Bay, Miss.
 For Dredging and Constructing Dam in Pascagoula River, Miss.
 For Constructing Revetment and Beam Wall and for Dredging at Carrollton, Saginaw River, Michigan.
 For Rock Excavating and Dredging in Niagara River, New York.
 For Dredging at Hyannis Warehouse and New Bedford Harbor, Mass.; Newport, R. I.; Pawtucket, Providence and Paucatuck Rivers, R. I., and Green Jacket Shoal, Providence Harbor, R. I.
 For Dredging in Ticonderoga River, New York, and Otter Creek, Vermont.
 For Dredging at Ogdensburg Harbor, N. Y.
 For Dredging Mosquito Creek, S. C.
 For Dredging and Removing Ledge in York Harbor, Maine.
 For Improving the Mississippi River below Cairo, Ill.
 For Improving the Harbor at Cedar Keys, Florida.
 For Improvement of Manatee River, Florida.
 For Improvement of Tampa Bay, Florida.
 For Improvement of Oakland Harbor, California.
 For Rebuilding and Repairing U. S. Propeller *Maud*, Mobile, Ala.
 For Rubble-Stone to be delivered at the Harbor at Beaufort, North Carolina.
 For Improving Cambridge Harbor, Maryland.
 For Pier Construction at Harbor of Ludington, Mich.
 For Improving Choptank River, Maryland.
 For Improving Duck Creek, Delaware.
 For Revetting Banks of Wappo Cut, S. C.
 For Improving the Inland Waterway from Chincoteague Bay, Virginia, to Delaware Bay, at or near Lewis, Delaware.
 For furnishing Piles, Stone, Manila Rope, Wire, Nails, Spikes and Screw Bolts, for Government Works on the Mississippi River, near St. Louis, Mo.
 For Dredging Moose-a-bee Bar, Maine.
 For Dredging in Penobscot River, Maine, between Bangor and Crosby's Narrows.
 For Dredging at mouth of Harlowe Creek, Inland Waterway between New Berne and Beaufort, N. C.
 For Dredging in Rockport Harbor, Maine.
 For Dredging in Camden Harbor, Maine.
 For Dredging in Harbor at Back Cove, Portland Harbor, Maine.
 For Dredging in Beaufort Harbor, North Carolina.
 For Dredging in Narraguagus River, Maine.
 For Dredging in Lubec Channel, Maine.
 For Dredging in Bellamy River, New Hampshire.
 For Dredging in New River, North Carolina.
 For Dredging in Harbor at Georgetown, S. C.
 For Improving Appomattox River, Virginia.
 For Rock for Jetty at mouth Columbia River, Oregon.
 For Dimension Stones Columbia River, Oregon.
 For furnishing material at Muskegon Harbor, Mich.
 For furnishing material at Frankfort Harbor, Mich.
 For furnishing material at Manistee Harbor, Mich.
 For furnishing material at Grand Haven Harbor, Mich.
 For Improving Harbor at Pentwater Harbor, Mich.
 For Stone and Mattress Work in Savannah Harbor and River, Ga.
 For Constructing Jetty at Entrance to Cumberland Sound, Ga. and Fla.
 For Construction of Wing Wall at Harbor of Saint Joseph, Mich.
 For Improving Harbor at Charlevoix, Mich.
 For furnishing material at Saugatuck Harbor, Mich.
 For Improving Harbor at Michigan City, Ind.
 For Improving Harbor at South Haven Harbor, Mich.
 For furnishing material at White River Harbor, Mich.
 For Removal of Wreck off Cape May, New Jersey.
 For Dredging at Harbor of Refuge at Portage Lake, Mich.
 For Dredging in Cape Fear River, North Carolina.
 For Improvement of Harbor at Delaware Breakwater.
 For Excavating Channel and Building Dike at Middle Neelish Hay Lake Channel, Michigan.
 For furnishing and delivering at Keokuk, Iowa, about 425 000 feet, B. M., of Timber.
 For Construction of Exterior Breakwater, Harbor of Refuge, Chicago, Illinois.
 For furnishing Stone for use at the Des Moines Rapids Canal and Dry Dock.
 For South Pier Extension, Calumet Harbor, Ill.
 For furnishing and delivering at Keokuk, Iowa, about 27 000 pounds Round and Flat Bar Iron.
 For Building Guard Cribbs at Lock No. 2, Great Kanawha River Improvement.
 For Improvement of Ice Harbor at Marcus Hook, Pa.
 For Improving of Schuylkill River, Pennsylvania.
 For Improving of Potomac River near Washington, D. C., Dredging and Embankment.
 For Improving of Potomac River near Washington, D. C., Dredging.
 For Improving Nomini Creek, Virginia, Dredging.
 For Improving Channel at Mount Vernon, Va., Dredging.
 For Improving Patuxent River, Maryland, Dredging.

- For Improving York River, Virginia, Dredging.
- For Improving Breton Bay, Maryland, Dredging.
- For furnishing one Dredge, one Tug, and two Dump Scows, for Removing Shoals in Saint Clair Flats Canal, Michigan.
- For Dredging in Little Harbor, New Hampshire.
- For Dredging in Calumet River, Illinois, between its Mouth and 108th Street.
- For Improving Entrance to Coos Bay, Oregon.
- For Improving Ship Channel in Galveston Bay, Texas.
- For Improving Raritan Bay, New Jersey.
- For Improving Gowanus Bay, New York Harbor.
- For Construction of Breakwater at Gordon's Landing, Lake Champlain, Vermont.
- For Breakwater at New Haven, Conn.
- For Construction of Breakwater at Port Chester, N. Y.
- For Extension of Breakwater at Greenport, N. Y.
- For Removing Obstructions in East River at Hell Gate.
- For Improving Appomattox River, Virginia.
- For furnishing the labor and material for repairing and building dams and shore protections on the Mississippi River, between Des Moines Rapids and the mouth of the Illinois River.
- For Improving Napa River, California.
- For Improving Mississippi River, 3d District.
- For Extending the Dike in New Haven Harbor, Conn.
- For Construction of Breakwater at Burlington Harbor, Vermont.
- For Dredging in Five Mile River Harbor, Conn.
- For Dredging in Milford Harbor, Conn.
- For Dredging at Orchard Harbor, N. Y.
- For Dredging and Excavating Rock at Wilson Harbor, N. Y.
- For Dredging and Excavating Rock at Olcott Harbor, N. Y.
- For Dredging in Stamford Harbor, Conn.
- For Dredging in Bridgeport Harbor, Conn.
- For Dredging at Wilson's Point, Norwalk Harbor, Conn.
- For Building Lock No. 7, Great Kanawha River, W. Va.
- For the Delivery of Rubble-Stone for Newburyport Harbor, Mass.
- For Improving Harbor at Sheboygan, Wis.
- For Constructing Brush and Stone Dike at Reedy Island, Delaware River.
- For Constructing a Pile and Stone Dike between Fisher's Point and Petty's Island, Delaware River.
- For Improving the Inland Waterway from Chincoteague Bay, Virginia, to Delaware Bay, at or near Lewis, Delaware.
- For the Delivery of Rubble-Stone for Harbor of Refuge, Sandy Bay, Cape Ann, Mass.
- For Improving Mispillion Creek, Delaware.
- For Improving Saline Harbor, Texas.
- For Rebuilding Superstructure at Manitowoc Harbor, Wis.
- For Construction of Breakwater at Rouse's Point, Lake Champlain, N. Y.
- For Construction of Breakwater, Harbor of Refuge, Milwaukee Bay, Wis.
- For Building Lock-keeper's House at Lock No. 1, Cumberland River.
- For Pier Extension at Kewaunee Harbor, Wisconsin.
- For Revetment Construction at Saint Clair Flats Ship Canal, Michigan.
- For Dredging Kenosha Harbor, Wisconsin.
- For Dredging Waukegan Harbor, Illinois.
- For Dredging Racine Harbor, Wisconsin.
- For Dredging in Jekeyl Creek, Georgia.
- For Dredging in Savannah River, Georgia.
- For building Cofferdams, Excavating Lock-pit, and Constructing part of Lock No. 1, Cumberland River.
- For the Improvement of Mobile Harbor, Alabama.
- For a Shore Protection at Erie, Pa., and for the Iron to be used therein.
- For Ice Piers in the Ohio River.
- For Cement, Bricks, Lumber and Shingles for Improvement of Black Warrior River, Alabama.
- For Improving Buffalo Bayou, Texas.
- For Removing Ledge of Solid Rock and Boulders from Detroit River.
- For Timber.
- For Dredging in Brunswick Harbor, Georgia.
- For Dredging at Bulkhead Shoal, Delaware River.
- For Dredging the Channel between the Islands of North Hero and South Hero, Lake Champlain, Vermont.
- For Dredging at Plattsburgh Harbor, New York.
- For Dredging and Blasting in Gloucester Harbor, Massachusetts.
- For Dredging in Ipswich River, Massachusetts.
- For Dredging in Plymouth Harbor, Massachusetts.
- For Dredging at Mifflin Bar, Delaware River.
- For Dredging Bar at Head of Bayou La Fourche, Louisiana.
- For Dredging in Portland Harbor, Maine.
- For Dredging in the Calumet River, between the Forks and one-half mile east of Hammond, Ind.
- For Dredging in Channel leading to Harbor at Baltimore.
- For Stone Revetment.
- For Dredging at Rouge River, Michigan.
- For Building No. 7 Lock House and Out-buildings, Great Kanawha River Improvement.
- For Protecting the Shore of Aransas Pass, Texas, from Erosion.
- For Building a Jetty at Entrance to Galveston Harbor, Texas.
- For Dredging Rock Excavation, Construction of Dikes, etc., in James River, Va.
- For Dredging Chicago Harbor, Ill.
- For Dredging Stearn's Dyke Cut in James River, Virginia.
- For Dredging at Narrows of Lake Champlain, New York.
- For Building four Scows for James River, Virginia.
- For Removal of Wrecks in Boston Harbor, Mass.
- For Modifying Draw Protection and Guide Piling of the Old Colony Railroad Bridge over the Taunton River at Somerset, Mass.
- For furnishing and placing Rip-rap Granite in the Eastern Jetty at Nantucket, Mass., and in the Eastern Breakwater at Stonington, Conn.
- For Dredging in Thames River, Connecticut.
- For Dredging in Norwalk River, Connecticut.

- For Building Superstructures and Dredging between Harbor Piers at Grand Marais, Mich.
- For Improvement of San Luis Obispo Harbor, California.
- Report relative to Obstructions in the Columbia River.
- A Supplemental Report of the Mississippi River Commission.
- Report of a Board of Engineers on the practicability of improving the Ohio River below Pittsburgh by means of movable dams.
- The second preliminary report of a Board of Engineers upon obstructions to navigation in the Columbia River, and upon the feasibility of a boat railway at the Dalles and Celilo Falls.
- Report relative to the commerce of the St. Mary's Falls Canal, Michigan.
- Report in relation to the admission free of duty of a foreign vessel for dredging the main ship-channel, New York Harbor.
- Report on proposed improvement in Willamette River.
- Report of a Board of Engineers relative to a plan for improving the mouth of the Cumberland River.
- Report relative to the construction of bridge at Omaha.
- Report concerning a breakwater at the mouth of the Housatonic River.
- Report on the condition of Fort Moultrie.
- Report on the cost of approaches to the Aqueduct Bridge.
- Report relative to the condition of the Missouri River near Sioux City, Iowa.
- Report relative to underground telegraph and telephone wires.
- Reports and estimates of the proposed improvement of Arkansas River.
- Report relative to a bar in the Columbia River.
- Report of the Board of Engineers appointed to examine into Smith's Windmill, and Petty's Island, Delaware River.
- Report on the cost of removing sand-bar at Block Harbor, Rhode Island.
- Report upon the work of deepening Sandy Hook Ship-channel.
- Report upon the construction of the State, War, and Navy Building.
- Report relative to the proposed changes in the bridge across the Arthur Kill.
- Report of the examinations and survey of the Hudson River from New Baltimore to Cox-sackie.
- Report relative to fortifications upon Puget Sound.
- Report of the examination and survey of the thoroughfare running from Cape May to the Great Bay north of Atlantic City, N. J.
- Report as to the cost of breakwater at Santa Monica Harbor, California.
- Report with estimate for appropriation to pay for gauging waters of Lower Mississippi River.
- Report respecting the proposed bridge over the Ohio River between Louisville, Ky., and Jeffersonville, Ind.
- Report on the Salmon Fisheries of the Columbia River.
- Legislation relative to the regulation of the Saint Clair Flats Canal.
- An estimate of an appropriation for the construction of barracks at Willett's Point, N. Y.
- Annual Report upon the Improvement of Certain Rivers and Harbors in Maryland, Virginia and North Carolina, in charge of Mr. S. T. Abert, being Appendix L.
- Annual Report upon the Improvement of the Navigation of Red River, Louisiana, and of Certain Rivers in Louisiana, Mississippi, Arkansas, and Tennessee, and Water Gauges on the Mississippi and its principal Tributaries, in charge of J. H. Willard, being Appendix U of the Annual Report of the Chief of Engineers for 1887.
- A list of the Civilian Engineers employed on River and Harbor Improvements, showing the time and place of employment and the compensation paid each.
- Quarterly Statement United States Army, Washington, D. C., April 13th, August 1st, October 2d, 1888, and January 12th, 1889.
- Annual Report of the Chief of Engineers of the U. S. Army. Parts I, III and IV, 1887. Parts I, II, III and IV, 1888.
- From Madame A. Durand Claye, Paris, France:
Rapport sur le Dessèchement du Lac Copais (Grece) par M Alfred Duraud Claye, Ingenieur en Chef des Ponts et Chaussées.
- From William B. Cogswell, Syracuse, N. Y.:
Framed Photograph Works of the Solvay Process Company at Geddes, near Syracuse, N. Y.
- From James S. Coleman, New York City:
Report of the Department of Street Cleaning of the City of New York for the year 1886, with a Review of the operations of the Department from 1882 to 1886.
- From the Commissioners of the State Reservation of Niagara, Henry E. Gregory, Treasurer and Secretary, New York:
Fourth Annual Report of the Commissioners of the State Reservation at Niagara for the year 1887.
- From Norman J. Coleman, Commissioner of Agriculture, Washington, D. C.:
Report on the Forest Conditions of the Rocky Mountains and other Papers.
- From Prof. George H. Cook, New Brunswick, N. J.:
The State Map of New Jersey on the scale of five miles to an inch.
The Relief Map of the State of New Jersey on the scale of five miles to an inch.
Final Report on the State Geologist, Vol. I, 1888.
- From L. Combarnot, Paris, France:
Rapport D'Ensemble sur la Mission dans l'Amerique du Nord Pendant L'Année, 1886.
- From Theodore Cooper, New York City:
A Treatise on the Political Economy of Railroads. Henry Fairbairn, London, 1836.
Report upon the Subject of the Explosions of Boilers in Boats Propelled by Steam.
Reports of the Board of Directors and Chief Engineer of the San Francisco and Marysville Railroad Company.
Second Report of the N. Y. and E. R. R., February 3d, 1841.

Communication made to the House of Representatives, February 19th, 1839, relative to the West Branch and Allegheny Canal.

Fourth Report of the Commissioners for the Improvement of the Navigation of the River Shannon, with Maps, Plans and Estimates and an Appendix. Dublin, 1839.

First Report of the Commissioners appointed by her Majesty to inquire into and consider the most effectual means of improving the Metropolis and of providing increased facilities for communication within the same, January 27, 1844.

From E. L. Corthell, Chicago, Ill.:
Hearing before the Committee on Commerce of the U. S. Senate as to the Bureau of Harbors and Waterways.

From Department of Agriculture, Washington, D. C.:
Annual Report of the Division of Forestry for 1887. B. E. Fernow, Washington, 1888.
Report of the Commissioner of Agriculture for the year 1887.

From Dyckerhoff & Söhne, Amöneburg, Germany:
Protokoll der XI General Versammlung des Vereins deutscher Cement Fabrikanten, February 24th and 25th, 1888.

From Engineering Society, Ann Arbor, Mich.; H. S. Crocker, Corresponding Secretary, Ann Arbor, Mich.:
The Technic. The Annual of the Engineering Society of the University of Michigan.

From the Engineering Association of New South Wales; W. E. H. Nicolle, Secretary, Sidney, New South Wales, Australia:
Minutes of Proceedings, Vol. II, 1886-1887.

From Engineering News Publishing Co., New York City:
Engineering News Atlas of Railway Construction, 1887-1888.

The Railways Terminating in London, with a Description of the Terminal Stations, and the Underground Railways. By Samuel Rea, New York, 1888.

A Business Man. By Arthur Helps, New York, 1885.

Final Report of her Majesty's Commissioners appointed to inquire into Accidents in Mines, etc., London, 1886.

From Engineers' Society of Western Pennsylvania; S. M. Wickersham, Secretary, Pittsburgh, Pa.:

The Use of Aluminium Alloys in the Steel Manufacture.

From Ernst & Korn, Berlin, Germany:
Normen für Einheitliche Lieferung und Prüfung von Portland Cement.

From B. E. Fernow, Chief of Forestry Division, Washington, D. C.:
Annual Report of the Division of Forestry for 1887.

From G. W. G. Ferris & Co., Pittsburgh, Pa.:

Souvenir Allegheny County Centennial, September 24th, 25th and 26th, 1888.

All Roads will lead into Pittsburgh in September. Why?

From Sanford Fleming, Ottawa, Canada:

Proceedings and Transactions of the Royal Society of Canada for the year 1886, Vol. IV.

From M. N. Forney, New York City:
Report of the Proceedings of the Twenty-first and Twenty-second Annual Convention of the Master Car Builders' Association for the years 1887-1888.

From James P. Foster, New York City:
Citizens' Atlas of American Politics, 1789-1888, with a series of colored Maps and Charts. By Fletcher W. Hewes.

From Wolcott C. Foster, Brooklyn, N. Y.:
Blue Print of a Table of Level Cuttings.

From H. N. Francis, Providence, R. I.:
General Description of the Providence Water Works.

From Prof. E. A. Fuertes, Ithaca, N. Y.:
Bulletin of the Agricultural Experiment Station of Cornell University College of Agriculture, November 3d, December 4th, 1888.

From Francis E. Galloupe, Boston, Mass.:
An Index to Engineering Periodicals, 1883 to 1887 (3 copies). Francis E. Galloupe, Boston, 1888.

From Henry J. Gielow, Brooklyn, N. Y.:
Four Photographs of the Yacht Lucerne.

From Lieut.-Col. L. Conway Gordon, Director-General of Railways, Simla, India:

Administration Reports on the Railways in India. 1879-1888.

Administration Report on the Railways in India, Part II, for 1887-88.

From E. Sherman Gould, Scranton, Pa.:

The Designing and Construction of Storage Reservoirs. By Arthur Jacob. New York, 1888.

From Brigadier-General A. W. Greely, Chief Signal Officer of the Army, Washington, D. C.:

United States Signal Service Monthly Weather Review, for the months of February, March, April, May, June, July, August, September, October and November, 1888.

Annual Report of the Chief Signal Officer of the Army. Parts I and II, 1887.

From George S. Greene, Jr., New York City:

Eighteenth Annual Report of the Department of Docks for the year ending April 30th, 1888.

Minutes of the Board of the Department of Docks from May 2d, 1870, to April 28th, 1877.

From William Hamilton, Toronto, Canada:

Annual Report of the Superintendent of the Toronto Water Works for the year ending 31st December, 1887.

From Sullivan Haslett, Brooklyn, N. Y.:
A Treatise of Land Surveying, comprising the Theory developed from Five Elementary Principles. W. M. Gillespie, New York, 1886.

- An Elementary and Practical Treatise on Bridge Building. S. Whipple, New York, 1873.
- Lives and Works of Civil and Military Engineers of America. Charles B. Stewart, New York, 1871.
- Trusses and Arches analyzed and discussed by Graphical Methods. Charles E. Greene, New York, 1879. Parts II and III.
- Practical Treatise on the Construction of Iron Highway Bridges for use of Town Committees. Alfred P. Boller, New York, 1876.
- An Essay on the Question of Location for a Ship-canal across the American Continent. Henry Stuchle, New York, 1870.
- A Handy Book for the calculation of Strains in Girders. William Humber, New York, 1869.
- The Elements of Graphic Statics. Karl von Ott, London, 1876.
- Engineer Field Book. C. S. Cross, New York, 1855.
- A Catechism of the Steam Engine in its various applications to Mines, Mills, Steam Navigation, Railways and Agriculture. John Bourne, New York, 1868.
- The Essential Elements of Practical Mechanics. Second Edition. Oliver Byrne, London, 1872.
- Manual of Geology. James D. Dana, Philadelphia, 1866.
- Appleton's Cyclopaedia of Drawing. W. E. Worthen, New York City, 1857.
- The Mechanical Principles of Engineering and Architecture. Henry Mosely, New York, 1866.
- The Theory of Strains in Girders and Similar Structures. Bindon B. Stoney, New York, 1873.
- A Treatise on the Construction and Management of Railways. John B. Jervis, Philadelphia, 1866.
- General Theory of Bridge Construction, containing demonstration of the Principles of the Art and their application to practice. Herman Haupt, New York, 1867.
- Graphical Analysis of Roof Trusses for the use of Engineers, Architects and Builders. Charles E. Greene, New York, 1879.
- A Treatise on Shades and Shadows and Linear Perspective. Charles Davies, New York, 1865.
- Twentieth Annual Report of the General Railroad Commissioners of the State of Connecticut for 1873.
- Hydraulic Tables, Coefficients, and Formulas for finding the discharge of Water from Orifices, Notches, Weirs, Pipes, and Rivers. John Neville, London, 1866.
- The Actual Lateral Pressure of Earthwork. Benjamin Baker, New York, 1881.
- Treatise on Hydraulics for the use of Engineers. J. F. D. Aubrieson de Voisiers.
- Weisbach Mechanics, 1st and 2d Edition. Julius Weisbach, Braunschweig, 1863-64.
- Recueil de dessins d'Execution concernant suif indication speciale, la ligne de Bologne a Pistole, etc. J. L. Fritche.
- Sanitary Engineering: a guide to the Construction of Works of Sewerage and House Drainage. Baldwin Latham, London, 1873.
- Railroad Gazette. 1873 to 1881.
- Mappe Foggiat Napoli.
- Galline della Traversata dell' Appennine sulla Linea Foggiat Napoli.
- A Guide Book to Civil and Mechanical Engineers.
- From Major David Porter Heap, Corps of Engineers, U. S. A., Secretary U. S. Light House Board, Washington, D. C.:
- Annual Report of the Light House Board for the fiscal year ending June 30th, 1887.
- From D. C. Henry, Watertown, Dakota: Tijdschrift van het Keninklijk Instituut van Ingenieurs, April 4th, 20th, and July 9th, 1888.
- From Rudolph Hering, New York City: Notes on the Pollution of Streams. Rudolph Hering, Concord, N. H., 1888.
- Report on European Sewerage Works. Rudolph Hering, 1881.
- Bound Reports and Documents connected with the Preliminary Investigation for a New Water Supply for the City of Philadelphia, Pa., 1883-87.
- From Albert B. Hill, New Haven, Conn.: Annual Report of the Department of the Board of Public Works, City of New Haven, Conn., for the year 1887.
- From Frank W. Hodgdon, Boston, Mass.:
- Annual Report of the Harbor and Land Commissioners for the year 1888.
- From William R. Hutton, New York City:
- Reports (made to the Honorable the Mayor and City Council of Baltimore) upon the Improvement of Jones Falls, October 7th, 1870.
- From F. R. Hutton, Secretary American Society of Mechanical Engineers, New York City:
- Annales du Conservatoire des Arts et Mé-tiers, Vols. I to VI, Nos. 1 to 41, inclusive.
- From William A. Ingham, Secretary Board of Commissioners Second Geological Survey of Pennsylvania:
- Annual Report of Geological Survey of Pennsylvania for 1886. Parts III and IV.
- Atlas Annual Report for 1886. Parts III and IV.
- Atlas Northern Anthracite Field. Part II.
- Atlas Eastern Middle Anthracite Field. Part II.
- Atlas Western Middle Anthracite Field. II.
- Atlas Bucks and Montgomery Counties. C. 7.
- From Indiana Society of Civil Engineers and Surveyors of the State of Indiana; Lewis S. Adler, Secretary, Logansport, Ind.:
- Proceedings of the Indiana Society of Civil Engineers and Surveyors of the State of Indiana, at its Eighth Annual Meeting, held in Indianapolis, January 17th, 18th and 19th, 1888, together with Constitution, By-Laws and other valuable matter.
- From Institution of Civil Engineers, James Forrest, Secretary, London:
- Experiment with a Steam Exhauster or Blower. George Bruntton.
- Autographic Drifting-Tests. John Goodman.
- Electrical Tramway in Hamburg. J. L. Huber.
- Improved Systems of Chaining for Land and Engineering Surveys. William Mann Thompson.
- Castletown Swing-Bridge. Charles Wawn.
- Covered Way as Constructed on the Glasgow City and District Railway. Walter Stuart Wilson.

- The Hooghly "Jubilee" Bridge. Sir Bradford Leslie. (With an abstract of the discussion upon the paper.)
- The Alexandra Dock, Hull. Arthur Cameron Hurtzig. (With an abstract of the discussion upon the paper.)
- On a Dipping or Fog Apparatus for Electric Light in Light-houses. Charles Alexander Stevenson.
- On the Heating of Carriages by Exhaust Steam on the Caledonian Railway. Dugald Drummond.
- Boiler Experiments and Fuel Economy. John Holliday.
- The Alignment of the Nepean Tunnel, New South Wales. Thomas William Keele.
- Mining Appliances in Westphalia. Messrs. Maluet, De Gournay and Suisse.
- The Classification of Continuous Railway Brakes. Arthur Wharton Metcalfe.
- River Gauging at the Vyrnwy Reservoir. John Henry Parker.
- Cresosoting Timber in New Zealand. William Sharp.
- Discharges of Circular and Egg-formed Sewers. William Thomas Olive.
- Arched Ribs and Voussoir Arches. Harold Medway Martin.
- Indian Woods suitable for Engineering Purposes. The Late Kunhya Lall (Rai Bahadur).
- Compressed Oil Gas and its Applications. Arthur Ayres. (With an abstract of the discussion upon the paper.)
- Economy Trials of a Non-Condensing Steam-Engine. Simple, Compound and Triple. Peter William Williams. (With an abstract of the discussion upon the paper.)
- Railway Engineering in British North America. Robert Jarratt Money.
- On the Sewage Flow of Chiswick. Joseph Hetherington.
- Pumping Machinery in the Fenland and by the Trentside. Lawrence Gibbs.
- Varieties of Clay and their distinguishing qualities for making good Puddle. William Gallon.
- On Balancing Foreign Currents on Telegraph Circuits. John William Fletcher.
- The Effect of Rolling and of Wiredrawing upon Mild Steel. Horace Allen.
- Transmission of Power by Compressed Air. Prof. William Cawthorne Unwin.
- Abstracts of Papers in Foreign Transactions and Periodicals.
- The Use and Testing of Open Hearth Steel for Boiler Making. The late Hamilton Goodall. (With an abstract of the discussion upon the paper.)
- The Economic Use of the Plane Table in Topographical Surveying. Josiah Pierce. (With an abstract of the discussion upon the paper.)
- The Distribution of Hydraulic Power in London. Edward Bayzand Ellington. (With an abstract of the discussion upon the paper.)
- On Machinery for the New Steel Works at Terni. Hugh Savage.
- Paved Carriage Ways in Sydney, New South Wales. Adrian Charles Mountain.
- Manganese in its Application to Metallurgy.
- Some Newly Discovered Properties of Iron and Manganese. Robert Abbott Hadfield. (With an abstract of the discussion upon the papers.)
- Flour Mills Machinery. Alfred Chatterton.
- The River Clyde. Daniel Macalister.
- Alpine Engineering. Leveson Francis Vernon-Harcourt.
- A New Method of Investigation applied to the action of Steam Engine Governors. Professor V. Dwelshauvers-Dery.
- The Prevention and the Extinction of Fires. Alfred Chatterton.
- Effect of Temperature on the Strength of Railway Axles, Part II. Thomas Andrews.
- The Tay Viaduct:
- I. The Tay Viaduct, Dundee. Cranford Barlow.
 - II. The Construction of the Tay Viaduct, Dundee. William Inglis. (With an abstract of the discussion upon the papers.)
- Abstracts of Papers in Foreign Transactions and Periodicals.
- List of Members, October 12th, 1888.
- Minutes of Proceedings, Vol. XCII, 1887-1888, Part II.
- Vol. XCIII, 1887-1888, Part III.
- Vol. XCIV, 1887-1888, Part IV.
- Brief Subject Index, Vols. LIX, XCIV.
- From the Institution of Engineers and Shipbuilders in Scotland; W. J. Millar, Secretary, Glasgow, Scotland: Transactions, Vol. XXXI, 1887-1888.
- From William Irelan, Jr., State Mineralogist, Sacramento, Cal.:
- Appendix to the Journals of the Senate and Assembly of the Twenty-fourth Session of the Legislature of the State of California, Vol. II, 1881.
- The Second and Fifth Annual Report of the State Mineralogist of California from December 1st, 1880, to October 1st, 1882, and for the year ending May 15th, 1885; also Report on the Borax Deposits of California and Nevada.
- Seventh Annual Report of the State Mineralogist for the year ending October 1st, 1887.
- From Iron and Steel Institute; J. S. Jeans, Secretary, London:
- The Journal of the Iron and Steel Institute, Nos. 1 and 2, 1888.
- From William Jackson, Boston, Mass.:
- Contract and Specifications for furnishing Cast-iron Water Pipes and Special Castings for Boston Water Works.
- Main Drainage Works of the City of Boston, Mass., 1888.
- Report of the Water Meter Testing Commission, Boston, 1888.
- Cochituate and Sudbury Water Supply, its Present and Future Development.
- From W. H. Jennings, Columbus, Ohio:
- Generalized Section of the Coal Measures of Southern Ohio.
- The Ohio Mining Journal, October, 1888.
- The Ohio Mining Journal—
- Vol. I, Nos. 1, 2, 3 and 4.
 - Vol. II, Nos. 1, 2, 3 and 4.
 - Vol. III, Nos. 1, 2 and 4.
 - Vol. V, Nos. 2 and 3.
 - Vol. VI, No. 3.
- Annual Reports of the Columbus, Hocking Valley and Toledo Railway Company of the State of Ohio for the years 1881, 1882, 1884, 1885, 1886 and 1887.

Proceedings of the Association of County Surveyors of the State of Ohio for the years 1880, 1881 and 1882; also Code of Rules or Instructions for the Government of County Surveyors.

Eighth and Ninth Annual Reports of the Ohio Society of Surveyors and Civil Engineers, held in Columbus, Ohio, January, 1887 and 1888; also Charter.
Constitution and By-Laws, with a List of Members.

From William Pierson Judson, Oswego, N. Y.:

The Niagara Ship Canal Report, adopted by the Oswego Board of Trade, February 16th, 1888.

From Alexis A. Julien, New York City:

The Decay of Building Stones of New York City.

On the Geology at Great Barrington, Massachusetts.

On the Variation of Decomposition in the Iron Pyrites, its Cause and its Relation to Density. Parts I and II.

The Microscopical Structure of the Iron Pyrites.

The Sealed Flanks of Crystals.

From John C. Kelley, New York City:

Statistics, Tables and Water Rates of Cities and Towns, together with Facts about Water Meters. Compiled by the National Meter Company.

From John Kennedy, Montreal, Canada:

Annual Reports of the Harbor Commissioners of Montreal for the years 1877 and 1885.

Reports in Relation to Improvements in the Harbor and Deepening the Ship Channel between Montreal and Quebec; also the Report of the Harbor Master for the year 1875.

Report of the Harbor Engineer on the various Works executed under his Superintendence during the year 1862.

Report of the Board of Engineers upon the Survey of Lake St. Peter in October, 1850.

Reports on the Improvement and Enlargement of the Harbor of Montreal, by Messrs. McAlpine Kirkwood, Childe, T. C. Keefer and Charles Legge, C. E.

Report on the Extension and Improvement of the Harbor of Montreal, by Robert Forsyth, C. E.; also The Annual Report of the Harbor Engineer for the year 1860.

Documents Relating to the Deepening of the Ship Channel through Lake St. Peter, etc., February, 1853.

Reports in Relation to the Affairs of the Harbor Commissioners of Montreal and the Deepening of the Ship Channel in Lake St. Peter and the River St. Lawrence.

Annual Reports of the Harbor Commissioners of Montreal for the year 1887.

From Louis H. Knap, Buffalo, N. Y.:

Nineteenth Annual Report of the Buffalo City Water Works, Buffalo, N. Y., for the year 1887.

From Königliche Technische Hochschule zu Berlin, Germany:

Programme für das Studienjahr, 1888-89.

From William G. Ladd, New York City:

A Copy of the Photograph of the Picture of the Bridge now building by General Sewell across the Hudson River.

From Olin H. Landreth, Nashville, Tenn.:

The Economical Production of Charcoal for Blast Furnace Purpose. O. H. Landreth, Salem, Mass., 1888.

From Landreth & Fitz Gerald, Schenectady, N. Y.:

Report of the Engineers to the Board of Sewer Commissioners of Greenbush, N. Y., 1889.

From E. D. Leavitt, Cambridgeport, Massachusetts:

Perspective Drawing of the Boston Sewerage Engine.

From J. Francis Le Baron, Greytown, Central America:

La Gaceta Diario Oficial, Nos. 35 to 42 inclusive.

From L. J. Le Conte, Oakland, California:

Facts connected with the Explosion of a Cargo of Dynamite aboard the Schooner *Parallel* while trying to clear the Entrance to San Francisco Harbor.

From Louis Lesage, Montreal, Canada:

Annual Report of the Superintendent of the Montreal Water Works for the year ending 31st December, 1887.

From Gabriel Leverich, Brooklyn, N. Y.:

The Cable Railway on the New York and Brooklyn Bridge. G. Leverich, New York, 1888.

Transactions of the fifth year ending May 31st, 1888, and Synopsis of Transactions on the New York and Brooklyn Bridge during five years ending May 31st, 1888.

Blue Print of Cost of Horse Power on Street Railways in New York and Brooklyn.

Plans for Increased Passenger Service on the New York and Brooklyn Bridge Cable Railway.

Report of the Trustees of the New York and Brooklyn Bridge for the year ending December 1st, 1888.

From Lorillard Brick Works Co., New York City:

Four Samples of Brick:

Dark Hard.

Light Hard.

Front.

Velvet Front.

From George B. Mallory, New York City:

Plate of the Steamer *Connecticut*.

From O. Masenlli, Chili:

The Republic of Chili and its Importance for European Emigration.

From Maritime Canal Company of Nicaragua, New York City:

Profile of the Nicaragua Inter-oceanic Ship Canal.

Birdseye View of the Inter-oceanic Canal of Nicaragua and Costa Rica.

Distances saved by the Inter-oceanic Canal of Nicaragua and Costa Rica.

- From New York Meteorological Observatory, Department of Public Parks. Dr. Daniel Draper, Director, New York City:
- Annual Report of the New York Meteorological Observatory for the year ending December 31st, 1887.
- Abstract of Registers from Self-recording Instruments. January, February, March, April, May, June, July, August, September, October, November and December, 1888.
- From Captain O. E. Michaelis, Augusta, Maine:
- The Bofors Steel Cast Guns. O. E. Michaelis, Augusta, 1888.
- From Robert Moore, St. Louis, Mo.:
- Smoke Prevention. Robert Moore, St. Louis, 1888.
- From Monsieur C. Ministre de Travaux Publics, Paris, France:
- Ports Maritimes de la France. Tome Sixième (2 partie) des Calonges à Hendaye. Paris, 1887.
- From George S. Morison, Chicago, Ill.:
- Tenth Census of the United States, Vol. XII, Part II, 1880. Also, Plates and Diagrams accompanying Part II of Report on Mortality and Vital Statistics.
- From Gilbert Murdock, St. John, N. B., Canada:
- Annual Accounts and Statements, with Superintendents' and Auditors' Reports of Sewerage and Water Supply for the City of Saint John (East Side) and Town of Portland for the year ending December 31st, 1887.
- From Howard Murphy, Secretary and Treasurer Engineers' Club of Philadelphia, Philadelphia, Pa.:
- Vol. II, No. 1. September, 1880.
No. 2. February, 1881.
No. 3. November, 1881.
- From Stuart Murray, Chief Engineer of Water Supply, Melbourne, Victoria, Australia:
- Eleven Drawing Plans Victorian Water Supply, Goulburn River Weir.
- Proposed North Boort Irrigation and Water Supply Trust. Application.
- Proposed East Boort Irrigation and Water Supply Trust. Application.
- Proposed Pine Hills Irrigation and Water Supply Trust. Application.
- Proposed Marquis Hill Irrigation and Water Supply Trust. Application.
- Shire of Wimmera Irrigation and Water Supply Trust. Application.
- Proposed Wandella Irrigation and Water Supply Trust. Application.
- Shire of Yarrowonga Irrigation and Water Supply Trust. Application.
- Annual Report of the Secretary for Mines and Water Supply on the working of the Regulation and Inspection of Mines and Mining Machinery Act, during the year 1885-1886. Copies for distribution of 1886.
- First Progress Report of Royal Commission on Water Supply, 1885. Copies for distribution.
- Fourth Progress Report of Royal Commission on Water Supply, 1887. Copies for distribution.
- Proposed Shire of Echuca Irrigation and Water Supply Trust. First Petition, Plans, Reports, etc.
- Reports upon proposed amendments of Scheme Cohuma Irrigation Trust. Also, General Report by Mr Culcheth.
- Proposed Lake Charm Irrigation and Water Supply Trust. Application.
- An Act to consolidate "The Victorian Water Conservation Acts, 1881-1886," and for other purposes (17th December, 1887).
- An Act to make better provision for the Supply of Water for Irrigation, and also for Mining, Manufacturing and other purposes (16th December, 1886). Copies for distribution.
- Further Progress Report of the Royal Commission on Water Supply, 1884.
- Report of the Chief Engineer of Water Supply upon the Coliban System.
- Surplus Water of the Loddon.
- Scarcity of Water in the Loddon River and Proposals for Subdivision of the Loddon Water.
- Further Progress Report of the Royal Commission on Water Supply, with Appendices thereto. Extracts from Minutes of Committee, together with Minutes of Evidence, etc. (August 31st, 1885).
- Water Supply to the Lower Loddon from Kow Swamp, via Box Creek and Pyramid Creek.
- Report on Irrigation in the Avoca Valley District. November, 1887.
- Storage and Regulation of the River Loddon. First Annual General Report by the Secretary for Mines and Water Supply. August, 1887.
- Memorandum, Tables, and Diagram in Connection with the Discharge of Water in Open Channels in Earth.
- Memoranda on the Data recently collected in Relation to Water Supply and Irrigation for Rural Districts.
- Contract at Schedule Prices, Victorian Water Supply.
- Second Annual General Report of the Victorian Water Supply. Copies for distribution.
- Proposed Buckley's Swamp Irrigation and Water Supply Trust. Copies for distribution.
- Victoria Water Supply, National Works Contract at Schedule Rates. Copies for distribution.
- Loddon River Weir and Dam, Schedule of Quantities. Copies for distribution.
- Storage and Regulating Weir of the Loddon River near Laanecoorie. Locality Plan. Copies for distribution.
- Second Annual General Report on the Victorian Water Supply, by the Secretary for Mines and Water Supply.
- Annual Report of the Secretary for Mines and Water Supply on the working of the regulation and inspection of Mines and Mining Machinery Act during the year 1887.
- Reports of the Mining Registrars for the quarter ended 30th June, 1888.
- From Ladislau Netto, Director-General National Museum, Rio de Janeiro:
- Archivos do Museo Nacional do Rio de Janeiro. Vol. VII, 1887.
- From Professor Simon Newcomb, U.S. Navy, Superintendent, Washington, D. C.:
- The American Ephemeris and Nautical Almanac for the year 1891.

Report of the Superintendent of the Nautical Almanac for the year ending June 30th, 1887.

From Edward P. North, New York City: *The North American Review* for May, 1888.

From Albert F. Noyes, West Newton, Massachusetts:
Annual Report of the City Engineer for the year 1886-1887.

From John L. Ogden, Philadelphia, Pa.:
Annual Reports of the Chief Engineer of the Philadelphia Water Department for the years 1882, 1884, 1886.

First Annual Message of Edwin H. Fitler, Mayor of the City of Philadelphia, with Annual Report of Louis Wagner, Director of the Department of Public Works, and Eighty-sixth Annual Report of the Bureau of Water for the year ending December 31st, 1887, issued by the City of Philadelphia, 1888.

From Ferdinando Ongania, Venezia, Italy:
The Venice News, Double Number, St. Mark's Day, April 25th, 1888.

From Charles Paine, Pittsburgh, Pa.:
The Westinghouse Electric Co. The Alternating System, 1888.

From William Pierson, Oswego, N.Y.:
Report adopted by the Oswego Board of Trade, February 16th, 1888, and Maps of proposed Niagara Ship Canal, with the connecting ways from the Great Lakes to New York, prepared for the Oswego Board of Trade to accompany Report by William Pierson Judson.

From H. V. & H. W. Poor, New York City:
Poor's Manual of Railroads, 20th and 21st Annual Numbers, for the years 1887 and 1888.

Poor's Directory of Railway Officials, for the year 1887.

From Thomas Prosser & Sons, New York City:
Ueber das Durchschlagen von Panzerplatten. A Sketch of the Life and Work of Alfred Krupp. K. W. & O. E. Michaelis.

From W. G. Purdy, Chicago, Ill.:
Annual Report of the Chicago, Rock Island and Pacific Railroad Company for the years 1867, '70, '73, '81, '82, '83, '84, '85, '86 and '87.

From George W. Rafter, Rochester, N. Y.:
On the Micro Organisms in Hemlock Water. George W. Rafter, Rochester, 1888.

From Railroad Commissioners of Iowa, Des Moines, Iowa:
Tenth Annual Report of the Board of Railroad Commissioners of the State of Iowa for the year ending June 30th, 1887.

From Samuel Rea, Philadelphia, Pa.:
The Railroads Terminating in London, with a Description of the Terminal Stations and the Underground Railways. Samuel Rea, New York, 1888.

From S. W. Reynolds, Boston, Mass.:
Annual Reports of the Mexican Central Railway Co., Limited, for the years 1880 to 1887, inclusive. Supplementary Contract of 1883, in Spanish and English.

Law of December 12th, 1885, and Contracts from June 30th, 1886, to November 30th, 1886. Spanish and English. Introductory Reports. Massachusetts Laws and Mexican Concession By-Laws.

From R. W. Richards, Sydney, Australia:
Yearly Report of the City of Sydney, Australia, for the year 1887.

From Henry B. Richardson, New Orleans, La.:
Report of the Board of State Engineers of the State of Louisiana, from April 20th, 1886, to April 20th, 1888.

From J. L. Ringwalt, Philadelphia, Pa.:
Development of Transportation Systems in the United States, with Illustrations of Hundreds of Typical Objects. J. L. Ringwalt, Philadelphia, Pa.

From Albert A. Robinson, Topeka, Kansas:
Annual Reports of the Atchison, Topeka and Santa Fe Railroad Co. for the years 1875, '78, '79, '86 and '87.

From Hon. William E. Rogers, Railroad Commissioner, State of New York, Albany, N. Y.:

Fifth Annual Report of the Board of Railroad Commissioners of the State of New York for the fiscal year ending September 30th, 1887. Vols. I and II.

From Royal Institute of Engineers, Hague, Holland:

Tijdschrift van het Koninklijk Instituut van Ingenieurs for the years 1867, '70, '71, '72, '73, '74, '75, '76, '77, '78, '79, '80, '81, '82, '83, '84, '85, '86, '87 and '88.

Register van het Tijdschrift van het Koninklijk Instituut van Ingenieurs, 1869-1884.
Het Leven en de Werken van den General Majoor Dr. I. P. Dalprut.

Repertoire de Cartes public par l'Institut Royal des Ingenieurs Neevlandais for the year 1855. Parts 1, 3, 4 and 6, 1859, 1865, 1868.

Register op de Werken van het Koninklijk Instituut van Ingenieurs. Erste Gedeelte Zaak Register and Tweede Gedeelte Personen Register, 1847 to 1869.

Reglement en Verordeningen 1871.

Catalogus der Boekery van het Koninklijk Instituut van Ingenieurs, 1837.

Platen behoeven de leig de Stroomsnelheidsmetingen op de rivieren den boven rijn en zijnetapken en de Booven Maas in de jaren 1875-1877.

Algemein Verslag van de Werkzaamheden. Rekening en Verantwoording lijst van Geschenken en Naamlijst der Leden over het Instituutsjaar 1869-1870.

From W. H. Russell, Springfield, Mass.:
Annual Reports of the Boston and Albany Railroad Company for the years 1872, 1880, 1886, 1887.

From Lieut. Richard Rush, Washington, D. C.:
Catalogue of the Exhibit of the Navy Department at the Centennial Exposition of the Ohio Valley and Central States at Cincinnati, Ohio, July 4th to October 27th, 1888.

From C. P. Sandberg, London:
Sandberg on the Use of Heavier Rails for Safety and Economy in Railway Traffic. C. P. Sandberg, London, 1889.

From William H. Sayward, Boston, Mass.:
Second Annual Convention of the National Association of Builders of the United States of America, held at Cincinnati, Ohio, February 7th, 8th and 9th, 1888.

From C. C. Schneider, New York City:
General Specifications for Railroad Bridges.

From Collingwood Schreiber, Ottawa, Canada:
Reports of the Railway Statistics of Canada for the year 1887.

From F. H. Short, Cincinnati, Ohio:
Annual Reports of the Cincinnati, Hamilton and Dayton Railroad for the years 1849, '51, '52, '57, '59, '60, '63, '64, '65, '66, '67, '80, '83, '84, '85 and '86.

From A. H. Simpson, New York City:
Annual Report of the Chief of the Bureau of Construction and Repair to the Secretary of the Navy for the fiscal year ended June 30th, 1887.

Report on European Dock Yards by Naval Construction. Philip Hichborn, U. S. N.
Views of Simpson Patent Improved Timber Dry Dock constructed by J. E. Simpson.

From Smithsonian Institution, Washington, D. C.:
Additions and Corrections to the List of Foreign Correspondents to July, 1888.
George H. Boehmer, Washington, 1888.
Systematic Arrangement of the List of Foreign Correspondents, July, 1888.
George H. Boehmer, Washington, 1888.
Copyright and Patents for Inventions, Vol. I, Copyright, 1879. Vol. II, Patents, 1883.
Verities in Verses combining Mottoes and Motives; Brotherhood, Fellowship and Acting Together; New Covenant Ordinances and Orders.
Annual Report of the Board of Regents of the Smithsonian Institution to July, 1885. Part II.

From Society of Engineers; Charles Julien Light, Secretary, London:
Transactions for 1887, and General Index, 1861-1886.

From F. D. Soone, Philadelphia, Pa.:
Banquet given to the Learned Societies of Philadelphia at the American Academy of Music, September 17, 1887. Closing the Ceremonies in Commemoration of the Framing and Signing of the Constitution of the United States.

From the State Board of Health of Massachusetts; Samuel W. Abbott, Secretary, Boston, Mass.:
Nineteenth Annual Report of the State Board of Health of Massachusetts.

From C. Stevens, Secretary San Francisco Free Public Library, San Francisco, Cal.:
Annual Report of the Board of Trustees of the San Francisco Free Public Library for the fiscal year ending June 30, 1888.

From Stevens Institute, Hoboken, N. J.:
The Stevens Indicator, Vol. V, No. 4, and Vol. VI, No. 1, January, 1889.

From Robert Surtees, Ottawa, Canada:
Annual Report of the Water Works Committee for the year ending 31st October, 1888.

From Professor George F. Swain, Boston, Mass.:
Reports on the Water Power of the United States, Part II, Vol. XVII. Tenth Census, 1880.
Ancient Covered Reservoirs. Charles H. Swain.

From Thomas M. R. Talcott, Atlanta, Georgia:
Appendix to the Thirtieth Annual Report of the Richmond and Danville Railroad Company, being a Supplementary Report of the General Superintendent on the Cost of Transportation.

From Edgar C. Thrupp, London:
A Paper on a New Formula for the Flow of Water in Pipes and Open Channels. Edgar C. Thrupp, London, 1888.

From John C. Trautwine, Jr., Philadelphia, Pa.:
The Civil Engineer's Pocket Book for 1888.

From A. J. Tullock & Co., Leavenworth, Kansas:
One Framed Photograph of the La Mine River Bridge.

From Union Bridge Co., New York City:
One Photograph and Album of Van Buren Bridge.
Two Framed Photographs of Poughkeepsie Bridge.

From United States Coast and Geodetic Survey, Washington, D. C.:
Report of the Superintendent of the United States Coast and Geodetic Survey showing the progress of the work during the fiscal year ending with June, 1886.
Bulletin No. 3. Tidal Levels and Flow of Currents in New York Bay and Harbor.
Bulletin No. 4. Resources of and Developments in Alaska.
Bulletin No. 5. The Value of the "Arcano Del Maro" with References to our Knowledge of the Magnetic Declination in the earlier part of the Seventeenth Century.
Bulletin No. 6. Secular Variation in the Position of the Agarie Line of the North Atlantic and of America, between the epochs 1500 and 1900 A. D.
Bulletin No. 7. Historical Review of the Work of the Coast and Geodetic Survey in connection with Terrestrial Magnetism.
Bulletin No. 8. Currents of New York Bay and Harbor.

From United States Geological Survey, Washington, D. C.:
Mineral Resources of the United States for the calendar year 1887.
Bulletins of the United States Geological Survey, Nos. 40 and 47.
Mineral Products of the United States, calendar years 1882 to 1887.
Atlas to Accompany a Monograph on the Geology and Mining Industry of Leadville, Col. Samuel Franklin Emerson, Washington, 1883.
Thirty-seven United States Atlas Sheets.

From United States Commission of Fish and Fisheries. Spencer F. Baird, Commissioner, Washington, D. C.:
Reports of the Commissioner of Fish and Fisheries for the years 1872 to 1885, Parts II to XIII, inclusive.

Bulletins of the United States Fish Commission, Vols. I, II, III, IV, V, VI for the years 1881 to 1886, inclusive.

The Fisheries and Fishery Industries of the United States. George Brown Goode, Washington, 1887.

From United States Light House Board, Washington, D. C.:

List of Beacons, Buoys Stakes and other Day Marks in the First and Second Light House District, corrected to May and June 1st, 1888.

Annual Report of the Light House Board for the fiscal year ended June 30th, 1888.

From United States Navy Department, Washington, D. C.:

Coaling, Docking and Repairing Facilities of the Ports of the World, with analyses of different kinds of coal.

Report of the Tests of Metals and other Materials for Industrial Purposes during the year ended June 30th, 1885.

Naval Reserves, Training and Material, June, 1886. General Information Series, No. VII, 1888.

From J. E. Watkins, Curator Section of Transportation and Engineering, Smithsonian Institution, Washington, D. C.:

Contributions of the Department of Transportation and Engineering to the Ohio Valley Centennial Exhibition, 1888.

From Edward B. Weston, Providence, R. I.:

Notes on the Water Meter System of Providence, R. I., from 1872 to 1887, inclusive.

From S. S. Wheeler, New York City:

Second Report of the Board of Electrical Control for the City of New York.

From Fred. H. Whipple, Detroit, Mich.: Whipple's Water Supply, 1888-1889. Fred. H. Whipple, Detroit, 1889.

From John Wiley & Sons, New York City:

The Design and Construction of Masonry Dams, giving the Method Employed in Determining the Profile of the Quaker Bridge Dam. Edward Wegmann, Jr., New York City, 1888.

From Messrs. Whitman & Chappe, St. Louis, Mo.:

Report of the Board of Public Improvements of St. Louis. Vol. I, 1879-1883; Vol. II, 1884-1887.

From John A. Wilson, Philadelphia, Pa.:

Arguments, Opening and Closing, of W. C. Kress, Counsel for Plaintiff in the Case of Frank McLaughlin vs. The Beach Creek, Clearfield and Southwestern Railroad Company and George J. Magee.

Frank McLaughlin vs. George J. Magee, General Contractor, and the Beach Creek, Clearfield and Southwestern Railroad Company. Testimony in the Case of Frank McLaughlin vs. George J. Magee, General Contractor, and the Beach Creek, Clearfield and Southwestern Railroad Company.

Ordinance of the Philadelphia and Reading Terminal Railroad Company, presented to Select Council of Philadelphia, April 19th, 1888.

From Carl Winiker, Brunn, Austria: Das Neue Tacheometer.

From Henry R. Worthington, New York City: The Worthington High Duty Pumping Engine for the Public Water Supply.

From other sources: Report of Proceedings of the New York Railroad Club at the Monthly Meeting, November 15th, 1888.

Recent Discussion on the Abolition of Patents for Inventions in the United Kingdom, France, Germany, and the Netherlands.

An Address to the Friends of Mississippi River Improvement and of Improved Waterways.

Speech of Hon. Joseph E. Brown of Georgia on the Proper Mode of Collecting the Revenues of the United States.

Speech of Hon. Thomas B. Reed of Maine on the Tariff.

Underground Conduits for Electrical Conductors and System of Distribution.

Colorado Horticultural Report for the years 1882, '83 and '84, Vol. I.

The Electric Magazine of Foreign Literature, June, 1888.

Some Applications of Graphical Statics. James R. Willett.

Description of the Canadian Pacific Railway.

Tornado Circular No. 1. New Series. Recent Advances in Electricity.

The Official Railway List, 1888.

Report of the Commission of Expert Engineers on Railroad Terminal Facilities.

First Report of the Board of Electrical Control for the City of New York.

Fourth Report of the Board of Commissioners of Electrical Subways of the City of Brooklyn, December 15th, 1887.

Report of the Third Annual Meeting of the Illinois Society of Engineers and Surveyors, held at Springfield, January 25th, 26th and 27th, 1888.

In Assembly Committee on General Laws upon the Hearing relative to Assembly Bill No. 552, entitled "An Act to Reduce the Cost of Telegraph Messages in the State of New York."

Théorie de M. Maurice Lévy Table pour le calcul des conduits. M. H. Vallot, Paris, 1888.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BUCK, WALDO EMERSON.....	544 Main st., Woburn, Mass...	July 3, 1889
KERNOT, WILLIAM CHARLES.....	University of Melbourne, Melbourne, Victoria, Australia...	March 6, 1889
SMITH, SAMUEL HARRISON.....	City Engineer, San Francisco, Cal.....	July 3, 1889

JUNIORS.

JOHNSTON, STEWART.....	Superintendent The Pittsburgh Steel Casting Co., Pittsburgh, Pa.....	March 6, 1889
KIBBE, AUGUSTUS SAYRE.....	Assistant Engineer New York State Canals, 55½ Myrtle ave., Albany, N. Y.....	March 6, 1889

CHANGES AND CORRECTIONS.

HONORARY MEMBER.

ADAMS, JULIUS W.....155 Congress st., Brooklyn, N. Y.

MEMBERS.

BASSEL, ROBERT.....	Royal Inspector Railway Construction and Traffic, Frankgasse 23, Köln-am-Rhine, Germany.
BRECKENRIDGE, CABELL.....	Marietta, Ohio.
CALKINS, FRANK A.....	Ogden, Utah.
DUNLAP, DE CLEMONT.....	Rockford, Ill.
GATCHELL, GEORGE S.....	Manager The Associated Elevators, Buffalo, N. Y.
GILLETTE, EDWARD, JR.....	Care B. and M. Engineer office, Lincoln, Neb.
GRISWOLD, FRANK L.....	Consulting Engineer, 443 Calle Peru, Buenos Ayres, Argentine Republic.
HEGEMAN, WILLIAM W.....	General Superintendent Ohio Valley R. R., Evansville, Ind.
HERBERT, ARTHUR P.....	Mexican Central R. R., Mexico, Mexico.

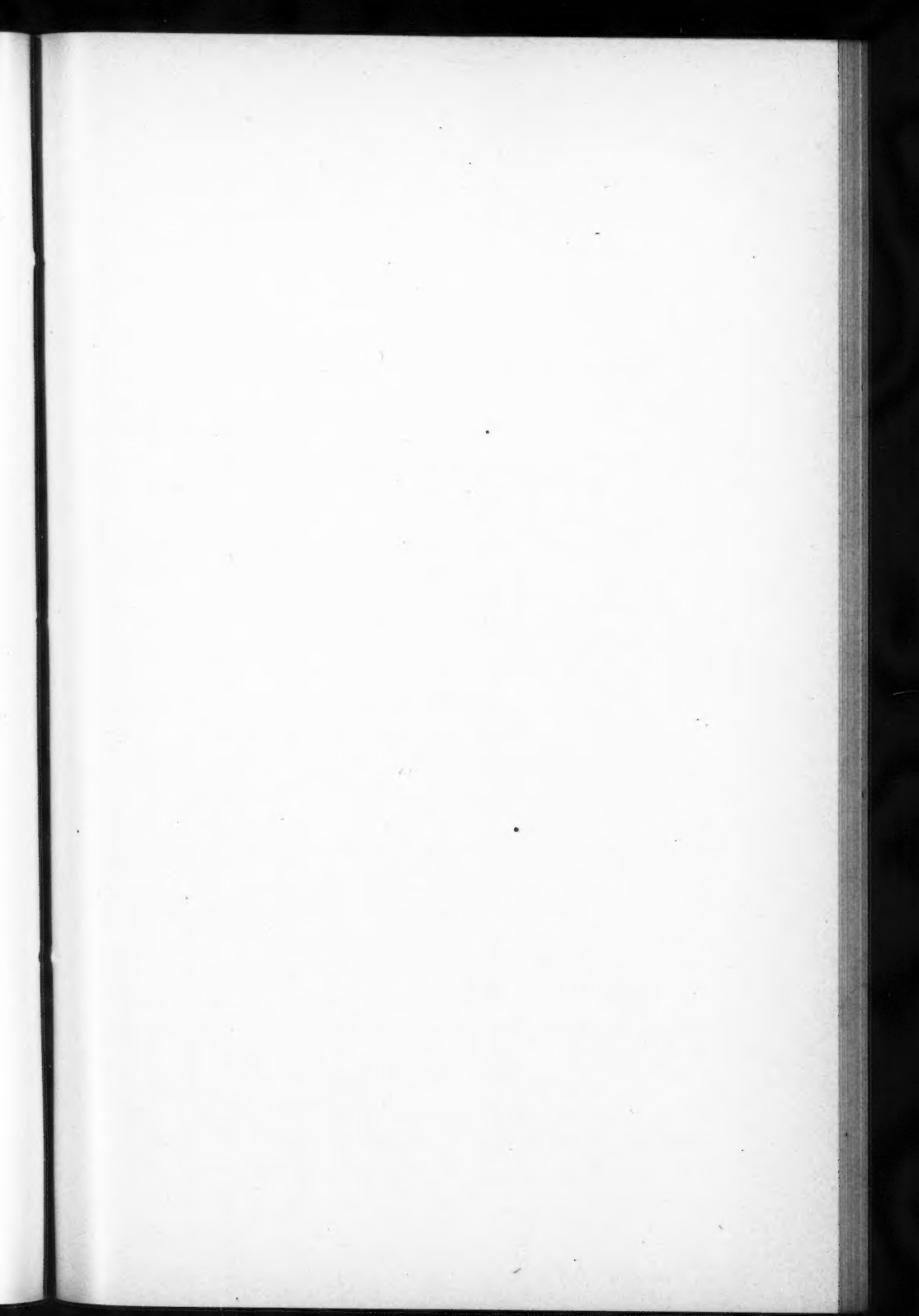
HORTON, HORACE E.....	443 Rookery, Chicago, Ill.
KILLEBREW, SAMUEL.....	Chief Engineer Frontera Div. Mexican Pacific Ry., San Juan Bautista, Tabasco, Mexico.
KNAPP, LOUIS H....	Superintendent and Engineer Buffalo Water Works, 280 Linwood ave., Buffalo, N. Y.
LIBBY, EDMUND D	41 Reservoir ave., Providence, R. I.
McNULTY, GEORGE W.....	45 Broadway, New York City.
PAINE, ARTHUR B.....	Windsor Hotel, New York City.
REA, SAMUEL.....	Vice-President Maryland Central Ry. Co., 9 St. Paul st., Baltimore, Md.
RODD, THOMAS.....	Chief Engineer North West System, Pennsyl- vania Lines West of Pittsburgh, Pittsburgh, Pa.
ROSS, JAMES.....	Windsor Hotel, Montreal, Canada.
RUGGLES, WILLIAM B	Chief Engineer Cincinnati Circular R. R., United Bank Bldg., Cincinnati, Ohio.
SAMPLE, JOHN H.....	Granville, Licking Co., Ohio.
SLATAPER, FELICIAN.....	Consulting Engineer North West System, Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa.
SMITH, WILLIAM SOOY.....	652 Rookery Bldg., Chicago, Ill.
SONNE, OTTO F.....	Rockwood, Tenn.
STRIEDINGER, JULIUS H.....	Tombstone, Arizona.
WARDLAW, JAMES R.....	24 State st., New York City.
WILSON, ELLIOTT H.....	(Care Wilson & Gillie), Butte, Montana.

JUNIORS.

BUTTS, ELIJAH P.....	Cairo Bridge, Cairo, Ill.
CARROLL, EUGENE.....	Covington Reservoir, Covington, Ky.
DAY, G. FREDERICK P.....	139 Mt. Vernon st., Fitchburg, Mass.
HORTON, SANDFORD.....	Niobrara, Knox Co., Neb.
MCCORMICK, GEORGE K.....	Resident Engineer Louisville and Nashville R. R., Bailey, Va.
PENNEY, WILLIAM W.....	Office of Water Commissioner, St. Louis, Mo.
VILLALON, JOSÉ R.....	Room 42, U. S. Army Bldg., New York City.

DEATH.

THAW, WILLIAM.....	Elected Fellow August 30, 1871; died August 17, 1889.
--------------------	----------------------------------------------------------





American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV, September-October, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

SEPTEMBER 4TH, 1889.—The Society met at 20 o'clock, W. W. Walker, M. Am. Soc. C. E., in the chair; John Bogart, Secretary. Ballots for Membership were canvassed, and the following candidates declared elected: As Member, Bushrod Wilber Taylor, Louisville, Ky. As Junior, Mario Lorini, New York City.

The death of Henry A. Bentley, M. Am. Soc. C. E., on May 13th, 1889; the death of William M. Lyon, F. Am. Soc. C. E., on July 3d, 1889; and the death of William Thaw, F. Am. Soc. C. E., on August 17th, 1889, were announced by the Secretary.

The appointment, by the President, was announced of the following Members as the Committee, authorized by the meeting during the Convention, to consider and report upon a systematic revision of the Constitution and By-Laws: Messrs. Wm. P. Shinn, C. B. Brush, F. Col-lingwood, M. Cohen, O. E. Michaelis, C. L. Strobel and S. Whinery.

A paper on The Sibley Bridge, by Messrs. O. Chanute, John F. Wallace and William H. Breithaupt, Members of the Society, was read by the Secretary.

Mr. H. C. Miller, who recently returned from Nicaragua, gave, by request, some account of the progress of the work on the Nicaragua Canal.

SEPTEMBER 18TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary.

The Secretary announced the death of James H. Morley, M. Am. Soc. C. E., on September 11th, 1889.

Written discussions by Messrs. George H. Pegram, C. F. Stowell, H. D. Bush, John Sterling Deans, D. J. Whittemore, J. A. L. Waddell and H. B. Seaman, on the paper on American Railroad Bridges, by Theodore Cooper, M. Am. Soc. C. E., were read by the Secretary, and the subject was further discussed by Mr. Cooper.

OF THE BOARD OF DIRECTION.

JUNE 6TH, 1889.—Applications were considered. Arrangements for the Annual Convention were made. The expediency of appointing a committee on the maintenance of the purity of domestic water-supply was discussed. A letter from the Committee of the Washington Memorial Arch was presented.

JUNE 20TH, 1889.—Final minor details as to Convention were arranged.

JULY 9TH, 1889.—Applications were considered. The resolution as to the appointment of a Committee of the Society concerning the purity of public water-supply, referred by the Convention to the Board of Direction, was considered. The resolution as to the appointment of a Committee to report to the Society a set of standard rail sections, referred by the Convention to the Board of Direction, was considered. The resolution as to the appointment of a Committee to recommend uniform methods of testing the materials used in metallic structures, referred by the Convention to the Board of Direction, was considered. Appropriations were made.

SEPTEMBER 3D, 1889.—Applications were considered. Financial business transacted.

MEMOIRS OF DECEASED MEMBERS.

ALBERT DWIGHT BRIGGS, F. Am. Soc. C. E.

DIED FEBRUARY 20TH, 1881.

Albert Dwight Briggs was born at Brattleborough, Vermont, January 25th, 1820. In 1838 he became connected with the Engineer Corps of the Western Railroad of Massachusetts, now forming a part of the Boston and Albany Railroad, and continued in that service during most of the time until 1845. He was during this period first engaged upon the Mountain Division, near Pittsfield, and afterwards assisted in making

the first surveys for the railroad from Pittsfield to North Adams. He also was engaged in the location of the railroad from Rochester to Niagara Falls, N. Y. In 1840-41 he was specially assigned to the work of constructing the bridge over the Connecticut River, at Springfield, for the Western Railroad. In 1843-44 he was connected with the Construction and Repair Department of the same road. From 1845 to 1846 he was engaged in bridge building with William Howe, the inventor of the "Howe Patent Bridge," and with Boody, Stone & Co. and others. In 1846-47 he had charge of the construction of the Connecticut River Railroad, from Northhampton to South Deerfield. In 1847-48 he was engaged in the construction of the Cheshire Railroad. In 1848 he was connected with the Springfield Car and Locomotive Works. In 1849-50 he was in charge of the extension of the New Haven and Northhampton Railroad. In 1850 Mr. Briggs bought of William Howe the right to build bridges, roofs, etc., under his patents, and he was thereafter interested in the construction of bridges in a majority of the States of the Union.

In 1872 Mr. Briggs became a Member of the Board of Railroad Commissioners of the State of Massachusetts, and held the position until his death.

Mr. Briggs became a Fellow of the American Society of Civil Engineers in May, 1870.

MARTIN CORYELL, M. Am. Soc. C. E.*

DIED NOVEMBER 30TH, 1886.

There are few more notable examples than Martin Coryell, of that adaptability to engineering practice, of widely varying character, which was required of the pioneers of this profession in America. He came upon the field at a period when specialties were unthought of, when circumstances made him at one time a hydraulic engineer, at another a mining engineer, opening the copper mines of Michigan or the coal fields of Pennsylvania, and again reverting to canals, to railroads and to water-works. He was one of those whose names are inseparably connected with the development of the resources of this country, and with the rapid progress made in means of transportation.

Mr. Coryell was born at New Hope, Bucks County, Pennsylvania, on July 20th, 1815. His father, Lewis S. Coryell, was a prominent man in that region, and he gave him an education superior to that commonly enjoyed by the rising generation of that day. After the rudimentary course at the common school of New Hope, he was placed in the private

* Committee to prepare memoir, Mr. William P. Shinn, Director Am. Soc. C. E., and Mr. John Bogart, M. Am. Soc. C. E.

school of Rev. Dr. Peter Studdiford at Lambertville, New Jersey, and later spent two years at a seminary in Burlington, N. J., under the instruction of John Gummere, a man of far more than local reputation as a mathematician and astronomer. Here was laid the foundation for those scientific attainments in which he afterwards achieved distinction. Failing health caused him to abandon books for a season, during which time he learned the carpenter's trade, an acquirement by no means superfluous for an engineer.

His entrance upon the profession was apparently without design. His skill in assisting Mr. Canvass White to examine the Delaware River with reference to the location of a site for the "State Dam," intended to provide a feeder for the Raritan Canal, led to Mr. White's suggestion that he should be employed by Colonel Simpson Torbert to determine the high and low water-marks of the river, and from this he passed to the position of rodman on the Delaware and Raritan Canal. After an experience of several years in different capacities, upon public works in the State of New Jersey, he was deemed competent to estimate the cost of repairs and the time necessary to restore navigation after a break which occurred in the Division Canal in the winter of 1839 and 1840. He continued in the employ of the State as Principal Assistant Engineer on the Delaware Division of the Canal until 1842, when he became Engineer in charge of the Morris Canal, which was then under the financial management of John Cryder, the representative of the English bondholders. The disaster to this enterprise, and the suspension of public works at the same time, rendered the engineering outlook so unpropitious as to induce Mr. Coryell, further persuaded by the advice of Judge John Fox, of his native town in Pennsylvania, to abandon his profession, in favor of the law. A year's study in the office of B. H. Brewster, of Philadelphia (who later became United States Attorney-General), so seriously affected his eye-sight as to end his legal aspirations. He was immediately engaged by the Canal Commissioners of Pennsylvania for the important task of introducing steam motive power on the West Chester Division of the Columbia Railroad, the chief difficulty to overcome being the popular prejudice then existing against it. His efforts were successful in all respects, and he remained for a considerable time in the service of the Commission as Superintendent of the Columbia Railroad from Philadelphia to the Inclined Plane.

Mr. Coryell's first connection with mining was through a survey which he was called upon to make of the underground workings of the Hazleton Coal Company's colliery. He next went to Michigan, where he figured as one of the pioneers in the exploitation of the remarkable copper deposits of that State. Returning to New Jersey in 1847, he engaged in general practice, being connected with the canals and with various railroad enterprises for the succeeding fifteen years. Prominent

among the achievements of this period of his life were the location of the greater part of the Belvidere Railroad, under the superintendence of the late Ashbel Welch, Past President Am. Soc. C. E., and the further development of the Hazleton coal fields and the railroad which has since enlarged into the Lehigh Valley system. In 1862 he became still more closely identified with mining interests, by locating at Wilkesbarre, in the heart of the coal regions. His experience also extended to the coal fields of Kentucky, Virginia and Cape Breton, as well as to the mineral districts of the far West.

While residing at Wilkesbarre he united with R. P. Rothwell, M. Am. Soc. C. E., the present editor of the *Engineering and Mining Journal*, and others, in founding the American Institute of Mining Engineers, of which he became the first Secretary. In 1868 he joined with Messrs. Wm. J. McAlpine, James O. Morse and others in re-organizing the American Society of Civil Engineers.

Mr. Coryell returned in 1876 to Lambertville, where his public spirit manifested itself in the organization of a water company and the construction of water-works, and in other projects for the improvement of the town. He was honored and admired by all who knew him, both for the manliness, kindness of heart and ready sympathy which characterized him in all his relations with his fellows, and for the zeal and ability he displayed in the prosecution of professional work, and in the organization and conduct of business requiring a broad and comprehensive grasp of the most intricate details.

Mr. Coryell died at his home in Lambertville, N. J., November 30th, 1886, at the age of seventy-one years, mourned by all who knew him, having been a valued member of the American Society of Civil Engineers since December 4th, 1867.

EUGENE F. FALCONNET, M. Am. Soc. C. E.

DIED OCTOBER 14TH, 1887.

Major E. F. Falconnet was born in the castle of Bremgarten, on the River Arr, near the City of Berne, Switzerland, in the year 1833. The Falconnets, though of noble ancestry and connections, had lost their estates during the wars of Napoleon and the succeeding revolutions. Major Falconnet acquired his education alternately at Zurich and Geneva, taking his final degree when he was quite a lad. He came to the United States with his father in 1850. After spending some time in the Northern States, Major Falconnet went on a visit to Mexico with his

uncle, Colonel F. Falconnet. Returning to the United States, he went to Tennessee where, in 1852, he became Assistant Engineer of the Mobile and Ohio Railroad. From 1855 to 1856 he was Resident and Division Engineer on the Mississippi Central and Tennessee Railroad; 1856-57 Principal Assistant Engineer on the South Western Railroad of Tennessee, with headquarters at McMinnville, Tenn.; 1858, Chief Engineer Wills Valley Railroad; 1859-61, Chief Engineer Nashville and North Western Railroad.

In 1860 Mr. Falconnet was appointed Sergeant-Major of the Rock City Guards. In 1861 he became a member of Rutledge Battery. This battery covered the retreat from Shiloh, Major Falconnet firing the last gun which was fired by confederates. As an officer of artillery and commander of cavalry, he served in the confederate army, during the late war, with distinction.

At the close of the war Major Falconnet resumed his professional work and was connected with the Tennessee and Pacific and the South Western Railroads, as Chief Engineer, from 1866 to 1870; afterwards Resident Engineer of Sparta Branch, Memphis and Charleston Railroad; for several years, afterward Chief Engineer, Cumberland and Ohio Railroad, from 1873-76; from 1877-79 President of Nashville and Tuscaloosa Railroad; in 1879 appointed Chief Engineer of the Owensboro and Nashville Railroad, and from that time until the date of his death prominently connected with the opening up and extension of very many of the Southern railroads, as well as many other engineering works in the Southern States.

In 1880 Major Falconnet became very much interested in aerial navigation. He made this subject a study for seven years, taking out patents on his inventions in the United States, England, Germany and France, and was preparing to build a model of his air ship at the time of his death.

Major Falconnet became a Member of the American Society of Civil Engineers, June 3d, 1874. Toward the close of the war he married Miss Burtwell, of Florence, Ala., who, with several children, survives him.

Major Falconnet was an able, painstaking and expert engineer; a man of rare gifts and of unassuming modesty; brusque in his business dealings, in personal intercourse a master of the lighter graces of society and of most charming manners. One of his most intimate personal acquaintances writes of him: "Yet variable and adventurous, and often stormy as his life has been, he was born to gentler conditions, and, except for his stern sense of duty, and an obstinate, unsoliciting modesty, his career might have been very much more brilliant, though it could not have been more honorable." He died at Nashville, Tenn., of malarial fever, greatly regretted by his widow and children, and a wide circle of friends and acquaintances.

CHARLES LATIMER, M. Am. Soc. C. E.*

DIED MARCH 25TH, 1888.

Charles Latimer, whose death occurred in Cleveland, O., March 25th, 1888, was born in Washington, D. C., September 7th, 1827, and was, therefore, at the time of his death, in his sixty-first year. He was fond of tracing his descent from the family of Bishop Hugh Latimer, the English martyr, after whom he named his eldest son, and whom he certainly resembled much in character, if the connection was not very direct.

At the age of fourteen Mr. Latimer was appointed a midshipman and entered the United States Naval Academy at Annapolis, from which he graduated, with credit, well up in his class; remaining in the Government naval service some thirteen years in all, one year of which was passed as Assistant Professor at the Naval Academy, and the remainder chiefly in sea service. He then resigned, and for a time served as an officer on a Mississippi River steamboat. His long and honorable career of railway service began in 1854, when he was twenty-seven years old, and for three years he was successively rodman, leveler, transitman and Assistant Engineer on the Mobile and Ohio and Mississippi Central and Tennessee Railroads. From 1857 to 1861 he was again engaged in steamboat service for the Mobile and Ohio Railroad, connecting that road with the Illinois Central.

When the war broke out, although Mr. Latimer was of southern parentage and residence, he did not waver a moment in his allegiance, but became a vehement Union man, and immediately entered the Government service in the field where he was deemed most useful, as Assistant Engineer in the United States Military Railway service. Here he was at once engaged in rebuilding and maintaining various roads in Kentucky and Tennessee, ending his service with Colonel Wright in Chattanooga in 1864-65. His military service, while full of interest and successful exertion, was not particularly brilliant in incidents; but in connection with his previous experience as a naval officer it undoubtedly laid the foundation for Mr. Latimer's most remarkable trait, his notable executive ability in the selection and management of men.

After the war Mr. Latimer returned for a short time to steamboat service, commanding one of the boats on the line above mentioned, but in 1867 he returned to engineering work on the St. Louis, Vandalia and Terre Haute and Dixon, Peoria and Hannibal Railroad (now of the Chicago, Baltimore and Quincy system), of which he was Principal Assistant Engineer.

* Committee to prepare memoir, Mr. A. M. Wellington, M. Am. Soc. C. E.

In 1871 he became Principal Assistant Engineer of the Chicago and Michigan Lake Shore Railroad, and in the following year the company recognized his ability by appointing him Chief Engineer. Later, Mr. Latimer accepted a position as Principal Assistant Engineer on the extension of the Hannibal and St. Joseph Railroad, and was thus employed for six months, when he became connected with the Atlantic and Great Western, since known as the New York, Pennsylvania and Ohio Railroad, which is now a part of the Erie system. This was January 1st, 1873. For two months he was Assistant Engineer, for fifteen months Assistant Chief Engineer, and in 1874 he was chosen Chief Engineer, which position he held constantly until March, 1886, when the consolidation of the road with the Erie, and a change of management, led to his resignation.

The position of Consulting Engineer, or engineer for the lesser company, was then tendered him, and he held it to the day of his death, engaging likewise in various consulting work. It was a desirable office for the company to have, but it was, beyond doubt, created more in recognition of Mr. Latimer's past services and in view of his intimate personal knowledge of the road than from the idea that it was inherently desirable if filled in ordinary fashion.

Mr. Latimer became a Member of the American Society of Civil Engineers April 5th, 1876, and was, in 1887, President of the Civil Engineers' Club of Cleveland, in which organization, as in everything for the advancement of his profession, he took a great interest. He married in 1866 a Miss Lombard, of Illinois, a woman of many noble qualities, and a true, devoted and unselfish wife, who died in 1875, leaving four children, three daughters and one son, who also survived Mr. Latimer.

The work on which Mr. Latimer's reputation as an engineer will chiefly rest, was his long and successful conduct of the Engineering Department of the New York, Pennsylvania and Ohio Railroad. That department was organized in a somewhat unusual way. The Chief Engineer not only had full control of engineering work proper, but of the track department and track forces as well, reporting only to the President, thus giving him very unusual power and responsibility. When Mr. Latimer began his duties, the road had been for years in complicated financial difficulties, as it continued to be during most of his administration. As a consequence the track was at first in very bad condition. Mr. Latimer took hold of the work with characteristic energy; organized his department with great care; began at once the system of exciting the personal interest and emulation of employees which continued throughout his management, and as a final result, when his chief engineership closed, he was able to show a track the equal of any road in the West, obtained by very moderate annual expenditures, and with the proud record that in his whole tenure of office not a single

passenger had lost his life or been seriously injured from accidents due to defects of track.

The result alone was something to be proud of, but even more interesting than the result was the manner in which it was obtained. Intensely interested in the work himself and strongly sympathetic in his nature, he early established between himself and his subordinates, high and low, the relation of friend and fellow-laborer rather than that of master and servant. Annual "Roadmasters' Meetings" were established early and continued during his administration, at which every question of track administration was discussed frankly, and suggestions were always welcomed and duly weighed. A regular system of inspections was also established on this road among the first. No money prizes were awarded, for Mr. Latimer would not countenance the idea that the men needed it to stimulate their fidelity, but praise and blame was carefully and equitably distributed. The same general system of management naturally permeated down through the force into the lower grades. The result was that friendly rivalry and *esprit de corps* were greatly stimulated, and each man had to a great extent the advantage of the united intelligence of the whole force in conducting his work, as well as the feeling that any slackness would be noticed and commented on.

Perhaps Mr. Latimer's greatest single service to engineering was the invention, in 1871, of the re-railing guard which bears his name, which is now almost universally approved. The first one of these was put in at the St. Joseph River bridge, on the Chicago and Michigan Lake Shore Road, of which Mr. Latimer was Chief Engineer, and within two years thereafter saved two passenger trains from wreck. The elements of this invention were not new; in fact, had so little novelty that patent was refused on them, but none the less Mr. Latimer deserved the credit of developing heretofore crude and imperfect forms into a perfect and satisfactory device.

Mr. Latimer was known outside of his profession more by two particular beliefs of his than as a civil engineer, viz., by his belief in the "divining rod," and by his vehement advocacy of the divine origin, in the pyramid of Cheops, of the Anglo-Saxon weights and measures. It is to be feared that these two personal idiosyncrasies, which to many seemed a belief in mere absurdities, led engineers who did not believe in them to do scant praise to Mr. Latimer's sterling qualities and really great abilities as an engineer and manager, and to forget during his life the homage due to a nobility of character, a generosity of spirit, and a purity and unselfishness of life which was more than admirable, and which will be long and tenderly remembered by those who had the good fortune to know him intimately. A more entirely unselfish man, perhaps, never lived, nor one who was less stimulated by mere personal ambition. Had he been more so, his professional career would undoubt-

edly have been even more successful; but he would hardly have left behind him in as great measure what would have been far more precious in his sight, the affectionate remembrance and good will of all who knew him, from the lowest trackman to the late Chief Justice of the United States. He was by no means slack in discipline, and could easily be stern upon occasion, but he was invariably just, and hence it is doubtful if he had, or ever had, an enemy in the world.

It was Mr. Latimer's habit for years to have family prayers night and morning, and his death was consistent with his life in that he was stricken with apoplexy on his knees, after his morning prayers. Beyond a few incoherent words, after he had been helped to his bed, he never spoke again, and he lived but a few hours. Could he have foreseen the stroke, he would have been the first to say: "It is well," nor is it likely that his composure would have been disturbed for a moment.

His funeral was a remarkable evidence of the universal respect and regard in which he was held. Six of his old roadmasters acted as pall-bearers: Messrs. M. J. McInarna, P. Bowen, P. Collopy, E. Collopy, T. G. Armstrong and J. Haller, and undoubtedly he had no truer mourners. Twenty civil engineers acted as honorary pall-bearers and escort, and the church was crowded with high and low of Cleveland—a Sunday-school class of a dozen Chinamen, whom Mr. Latimer had taught for years, and who sent in one of the finest floral tributes, being especially conspicuous.

"A life of honor and of worth hath no eternity on earth; 'tis but a name," and the memory of Mr. Latimer, with that of many others less worthy, will gradually fade away, but it can hardly be while any yet remain who knew him intimately. He was not only an engineer of marked ability, but as nearly as it is often given to men to be, a man without guile and without sin.

HENRY FRANCIS WALLING, M. Am. Soc. C. E.*

DIED APRIL 8TH, 1888.

Henry Francis Walling died April 8th, 1888, at his home in Cambridge, after a brief illness, of heart disease. He was born in Burrillville, R. I., June 11th, 1825. He was educated in the public schools of Providence, where his father carried on a mercantile business for many years. He is remembered as a sober, thoughtful pupil, with a mind constantly at work, and, in mathematics especially, excelling without effort; he was disposed to experiment for himself, rather than accept the solutions of others—a trait which distinguished him through life.

* Committee to prepare memoir, Mr. Thomas Doane, M. Am. Soc. C. E., and Mr. Frank O. Whitney, M. Am. Soc. C. E.

After graduation from the public schools he fitted himself for a university education at the school of Thomas C. Hartshorn, and at Lyon and Frieze's, but on account of his early marriage did not enter college.

He married Miss Maria Fowler Wheeler in 1847.

The issues of this marriage were a son of great promise, who died while in Yale College, and two daughters, who, with their mother, survive him.

Mr. Walling for a long time was occupied in teaching an evening drawing school, and as Assistant Librarian of the Providence Athenæum. He early became a partner with the late Samuel Barrett Cushing, M. Am. Soc. C. E., and entered upon the business of map-making, commencing with that of Northbridge, Mass.

In 1858 he left Providence and went to New York, where he established his business on a much larger scale, and was very successful until 1861, when it was ruined by the breaking out of the civil war.

In March, 1868, Mr. Walling accepted the Chair of Civil and Topographical Engineering in the Pardee Scientific School of Lafayette College, at Easton, Pa. After three years he resigned his professorship, and, moving to Boston, entered once more upon the business of map-making.

The last few years of his life were spent upon the United States Geological Survey, and at the time of his death he was engaged, with others, in making an extensive and accurate map of Massachusetts, which the Government is now publishing. Mr. Walling prepared and published maps of over twenty states and provinces, two hundred and eighty counties and one hundred cities and special localities. He became a Member of the American Society of Civil Engineers May 6th, 1868, and was an active and respected member of the Society. During his life he contributed several papers to its Transactions. He was a member of the Local Committees at the Boston and Washington Conventions.

Professor Walling had the love and respect of all who knew him; hospitable and sociable at his own home and eminently companionable among his scientific associates, he was notably kind and patient with his assistants and employees. He never made an enemy and left a friend in every one who knew him.

WILLIAM S. BARBOUR, M. Am. Soc. C. E.

DIED FEBRUARY 24TH, 1889.

William S. Barbour was born in Boston, Mass., December 1st, 1834. His parents removed to Cambridge when he was still young and his home was always afterwards in that city. He was educated at the Cambridge High School and at the Lawrence Scientific School, and afterwards studied in the office of W. Mason, C. E., with whom he entered into partnership about the year 1856.

Subsequently he became connected with the construction of street railways, and in 1876 was elected City Engineer of Cambridge, holding that office at the time of his death. During his services as City Engineer, to which he was annually re-elected, many important and intricate problems of city work were presented and solved by him, including a study of the sewerage of the city.

At the time of his death the Mayor and City Council of the City of Cambridge expressed their appreciation of the services rendered to the city by Mr. Barbour, both by formal resolutions and by speeches referring to many details of those services.

Mr. Barbour became a Member of this Society April 17th, 1872, and was always greatly interested in the elevation of the profession.

Mr. Barbour was married in 1862 to Miss Julia Battis of Roxbury, who, with two sons, survives him.

The faithful prosecution of the duties of a City Engineer involves the study and application of many and varied engineering problems, and successful work in such an office is an essential element in the comfort and prosperity of a city. The thorough approval by the citizens of Cambridge of the work of a man, modest and retiring as Mr. Barbour was, shows that the duties of this important office were always well performed.

CHARLES C. SMITH, M. Am. Soc. C. E.

DIED APRIL 17TH, 1889.

Colonel Charles C. Smith was born at Niagara Falls in the year 1830, and was the only son of Major C. H. Smith. In 1850 he went with Major Barnard to Mexico, with the Government expedition, to survey the Isthmus of Tehuantepec. On his return from this expedition he applied himself to the practice of his profession, and was connected with various railroads in Massachusetts, Ohio, Indiana, Minnesota and Kansas until his retirement from active business in 1888.

At the breaking out of the late civil war Colonel Smith entered the volunteer service, with the rank of Captain, serving with his regiment, the 2d Ohio Cavalry, until February, 1863, when he was commissioned Colonel of the 10th Ohio Cavalry, which he commanded until 1864, when he was assigned to duty as commander of the 2d Brigade, 3d Division, Cavalry Corps, under General Judson Kilpatrick.

Colonel Smith organized the 10th Ohio Cavalry, which went through the campaigns of middle and east Tennessee, Georgia, North and South Carolina, and was prominent in most of the engagements and battles of these campaigns. The perfect discipline and splendid fighting qualities of this regiment won for it the distinction of Kilpatrick's favorite sabre charging regiment. In the early part of 1865 Colonel Smith's health had become so impaired that he could no longer remain in the army.

Colonel Smith's military service extended through the greater portion of the period of the Civil War, and was brilliant and important in the extreme. Of this period of his life one of his friends says: "As a tactician and disciplinarian he had no superior. He possessed courage, coolness, quiet power and the tact for organizing and holding large forces of men in thorough subordination, and the spirit to imbue them with soldierly enthusiasm."

On his return to his home he resumed his work in connection with the construction of railroads, designing, while Chief Engineer of the St. Paul, Minneapolis and Manitoba road, the stone viaduct across the Mississippi at Minneapolis, which was his last and greatest engineering feat.

Colonel Smith became a Member of the American Society of Civil Engineers July 10th, 1872.

In December, 1888, he made an extended tour through Europe with Mrs. Smith, returning to the United States in April, 1889. He died at Norwalk, Ohio, on April 17th, a few days after his return from Europe, deeply regretted by a large circle of personal and professional friends.

October, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

OCTOBER 2d, 1889.—The Society met at 20 o'clock. Vice-President A. Fteley in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates declared elected. As Members: William Augustine Aiken, Mt. Vernon, O.; Ward Baldwin, Cincinnati, O.; Sumner Homer Bodfish, Washington, D. C.; Bernard Richardson Green, Washington, D. C.; Ellis Bradford Noyes, Fort Edward, N. Y.; Charles Olmstead Parker, Macon, Ga.; John Curtis Patterson, Poughkeepsie, N. Y.; Olaf Ridley Pihl, Cascade Locks, Ore.; Anderson Harvey Tyson, Reading, Pa.; Alva Morgan Van Anken, Denver, Colo. As Juniors: Friedrich Rosenberg, Jersey City, N. J.; William White Seitzinger, Tarrytown, N. Y.

Ballots were canvassed on the following resolutions:

Whereas, It is a well-known fact that many cities and towns on the Atlantic Coast have suffered very greatly from impurities in their water supplies, due to various causes, and that no adequate remedy, meeting all conditions, has been found therefor; and, *Whereas*, these impurities are often due to natural causes, which have not been adequately investigated on account of the difficulty of centralizing the individual efforts of all parties engaged in said investigations,

Resolved, That a committee of three members of this Society be appointed by the President, to ascertain the best means of concentrating all obtainable information in such a manner as to secure useful results and to report to the annual meeting of this Society what further action, in their opinion, should be taken in the premises.

On this resolution there were 235 affirmative and 19 negative votes. This resolution was declared adopted.

Resolved, That a committee be appointed by the Board of Direction to be authorized and instructed to report to the Society a set of standard rail sections of weights, beginning at 40 pounds, and advancing by increments of 5 to 100 pounds per lineal yard.

On this resolution there were 218 affirmative and 35 negative votes. This resolution was declared adopted.

Resolved, That a committee of seven members of the Society be appointed by the President to recommend uniform methods of testing the materials used in metallic structures.

On this resolution there were 257 affirmative and 7 negative votes. The resolution was declared adopted.

Resolved, That the same committee be requested to report such requirements for these materials as, in their judgment, may conduce to further improve the grade of such structures.

On this resolution there were 168 affirmative and 82 negative votes. The resolution was declared adopted.

A paper on Experiments Relating to Hydraulics of Fire Streams, by John R. Freeman, M. Am. Soc. C. E., was read by the author and discussed by Messrs. Weston and Merriman.

OCTOBER 16TH, 1889.—The Society met at 20 o'clock. J. J. R. Croes, M. Am. Soc. C. E., in the chair; John Bogart, Secretary.

The presentation by Mr. Frederick Ewart Robertson, Assoc. M. Inst. C. E., of an album of photographs, with description of the Sukkur Bridge in India, was announced by the Secretary.

A paper by J. B. Johnson, M. Am. Soc. C. E., on "Cast-Iron—Strength, Resilience, Tests and Specifications," was read by the Secretary and discussed by Messrs. Just and Berg.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
AIKEN, WILLIAM AUGUSTINE.....	Chief Engineer Mt. Vernon Bridge Co., Mt. Vernon, Ohio.	Oct. 2, 1889
BALDWIN, WARD.....	(Elected Junior March 2, 1881). Assistant Engineer in charge of office, Cincinnati, New Orleans and Texas Pacific Ry, 35 West Fourth st., Cincinnati, Ohio.....	Oct. 2, 1889
BODFISH, SUMNER HOMER.....	Colorado Springs, Col.....	Oct. 2, 1889
GREEN, BERNARD RICHARDSON.....	1738 N st., Washington, D. C..	Oct. 2, 1889
NOYES, ELLIS BRADFORD.....	(Elected Junior July 7, 1880). Assistant Engineer in charge, Fort Edward, N. Y.....	Oct. 2, 1889
PARKER, CHARLES OLMSTEAD.....	Assistant General Manager Jacksonville, Tampa and Key West R. R. System, Jacksonville, Fla.....	Oct. 2, 1889
PIHL, OLAF RIDLEY.....	Cascade Locks, Oregon.....	Oct. 2, 1889

TAYLOR, BUSHROD WILBER.....	Engineer Main. of Way Jeffer- sonville, Madison and Indian- apolis Div. Penn. Lines west of Pittsburgh, Louisville, Ky. Sept. 4, 1889
TYSON, ANDERSON HARVEY.....	526 Court st., Reading, Pa ... Oct. 2, 1889
WHITE, TIMOTHY SIDNEY.....	President and Chief Engineer Penn. Bridge Co., Beaver Falls, Pa.....April 3, 1889

JUNIORS.

CORNELL, JOHN NELSON HAYWARD..	(Care Aqueduct Commission), Yonkers, N. Y..... May 1, 1889
LATHAM, NORMAN SMITH.....	724 President st., Brooklyn, N. Y..... July 3, 1889
SEITZINGER, WILLIAM WHITE.....	P. O. Box 88, Tarrytown, N. Y. Oct. 2, 1889

CHANGES AND CORRECTIONS.

MEMBERS.

BEAHAN, WILLARD.....	(Care Union Bridge Co.), 1 Broadway, New York City.
BLACKWELL, CHARLES.....	Assistant Superintendent Toledo, St. Louis and Kansas City R. R., Frankfort, Ind.
BLAND, JOHN C.....	Consulting Engineer, Colorado Springs, Col.
DAGRON, JAMES G.....	Engineer of Bridges Baltimore and Ohio R. R., Baltimore, Md.
DOANE, WALTER A.....	Principal Assistant Engineer Norfolk and Western R. R., Roanoke, Va.
EARLEY, JOHN E.....	Tehuacan, Puebla, Mexico.
FORSYTH, ROBERT.....	Engineer Illinois Steel Co., 1035 Rookery, Chicago, Ill.
FULTON, JOHN A.....	Bridge Engineer Lake Shore and Michigan Southern Ry., Cleveland, Ohio.
HAVEN, WILLIAM A.....	Helena, Montana.
HODGES, ARTHUR.....	Chief Engineer West End Street Ry, 81 Milk Street, Boston, Mass.
JENKINS, WILLIAM D.....	Chief Engineer New Orleans, Natchez and Ft. Scott Ry, Natchez, Miss.
MORRIS, S. FISHER	467 West Twenty-third st., New York City.
ODELL, FREDERICK S.....	32 South Fifteenth ave., Mount Vernon, New York.
RAYMOND, CHARLES WARD.....	Manager Merrimac Mining Co., Platona, Conejos Co., Col.
SANDERSON, J. GARDNER.....	Kingston, N. Y.
SCHMIDT, MAX O. E.....	527 North State st., Chicago, Ill.

- TALCOTT, E. N. KIRK.....6730 Lafayette ave., Englewood, Ill.
 THACHER, EDWIN.....258 West Main st., Louisville, Ky.
 VANCE, HART.....Cheshire, Gallia Co., Ohio.
 WILLIAMSON, WM. GARNETT.....(Williamson & Earl, Civil Engineers), Mont-
 gomery, Ala.
 WROTNOWSKI, ARTHUR F.....Atlantic City, N. J.

JUNIORS.

- BENSEL, JOHN A.....Assistant Engineer Department of Docks,
 64 East Seventy-ninth st., New York City.
 FARGUSSON, MARK.....Southport, N. C.
 MCCORMICK, GEORGE K.....Resident Engineer Louisville and Nashville
 R. R., Dryden, Lee Co., Va.
 POLLEDO, YSIDORO.....Manager "Sta Barbara" Sugar Works,
 Apartado 167, Matanzas, Cuba.
 ROSENWEIG, ALFRED.....Manager "La Mexicana" Land and Mining
 Co., and California Land Co. of Mexico
 (Ltd), La Paz, Baja California, Mexico.

RESIGNATION.

JUNIOR.

Date of Resignation.

- SHEPARD, WILLIAM T.....Sept. 4, 1889

DEATH.

- MORLEY, JAMES H.....Elected Member, Oct. 6, 1886; died Sept.
 11, 1889.

ADDITIONS TO LIBRARY AND MUSEUM.

- From American Institute of Mining
 Engineers, Dr. R. W. Raymond,
 Secretary, New York City:
 Ore—Deposits of the Black Hills of Dakota.
 Franklin R. Carpenter.
 Proceedings of the Fifty-third (Nineteenth
 Annual) Meeting, New York City, Febru-
 ary, 1889.
 The Geology of Buffalo as Related to Natural
 Gas Explorations along the Niagara River.
 Charles Albert Ashburner.
 The Copper Deposits of Copper Basin, Ari-
 zona, and their Origin. William P. Blake.
 An Automatic Dumping Cradle for Mine
 Cars. H. S. Munroe.
 Notes on the Electrolytic Assay of Copper.
 William Glenn.
 The Determination of Silicon in Ferro-Sili-
 cons: Its Occurrence in Aluminum as
 Graphitoidal Silicon; and a Study of its
 Reactions with Alkaline Carbonates.
 Henry J. Williams.
 The Influence of Silicon in Cast-Iron. H. S.
 Fleming, W. J. Keep and Edward Orton,
 Jr.
 A Rapid Method for the Determination of
 Phosphorus in Certain Ores. T. Reed
 Woodbridge.
 The Concentration of Iron Ore. John Birk-
 inbine and Thomas A. Edison.
 Note on the Koepe System of Winding from
 Shafts. John H. Harden.
 A Review of the Iron Mining Industry of
 New York for the Past Decade. John C.
 Smock.
 Supplementary Note on Blast Furnace Lines.
 Edward Walsh, Jr.
 The Desulphurization of Pyritiferous Iron
 Ores. Sterling G. Valentine.
 Coal Versus Oil in the Puddling Furnace and
 in Raising Steam. G. H. Billings.
 An Automatic Dumping Cradle; Discussion.
 H. S. Munroe.
 Some Thoughts Relating to the American
 Institute of Mining Engineers and its Mis-
 sion. E. C. Potter.
 Steel Rails and Specifications for their Manu-
 facture; Discussion. Robert W. Hunt.
 Note upon some Results of the Storage of
 Water in Arizona. William P. Blake.

Nails from Tin-Scrap. Oberlin Smith.
 The Neustrom Magnetic Separator. Robert Anderson Cook.
 The Present Status of Electric Transmission of Power. Richard P. Rothwell.
 Tuyere Slagging-Valve. Edgar S. Cook.
 Gold-Milling in the Black Hills. H. O. Hofman.
 A Rapid Method for the Reduction of Ferric Sulphate in Volumetric Analysis. Clemens Jones.
 A Present Need in the Engineering Profession. William B. Potter.
 Hollow Iron Pig-Patterns. B. F. Fackenthal.
 Rail Sections. Frederic A. Delano.
 Pig Iron of Unusual Strength. Fred. P. Dewey.
 Soaping Geysers. Arnold Hague.
 The Occurrence and Treatment of the Argenterous Manganese Ores of Tombstone District, Arizona. Charles W. Goodale.
 Note on the Nickel Ore, Russell Springs, Logan County, Kansas. Fred. P. Dewey.
 The Distribution of Phosphorus in the Ludington Mine, Iron Mountain, Michigan; A Study in Irochemic Lines. David H. Browne.
 The New Dressing Works of the St. Joseph Lead Company, at Boune Tene, Missouri. H. S. Munroe.
 The English versus the Continental System of Jigging; is Cloro-Sizing Advantageous? H. S. Munroe.
 Notes on the Bernice Anthracite Coal Basin, Sullivan County, Pa. Clarence R. Claghorn.
 Note on the Influence of Columbite Upon the Tin-Assay. Franklin R. Carpenter.
 A Note Upon the Modification of the Reducing Process Used by the Carbon Iron Company. Alfred E. Hunt.
 A New System for Operating Regenerative Hot Blast Stoves. Jacob T. Wainwright.
 Prominent Sources of Iron Ore Supply. John Birkinbine.
 Catalogue of Officers, Members, Rules, etc., to June 1st, 1889.
 Coal Transfer of the Mt. Carbon Company, Limited. W. N. Page.
 An Occurrence of Copper Glance North of Lake Huron, with Notes on the Structure of the Locality. James T. B. Ives.
 Note on the use of Crude Petroleum as Fuel for Raising Steam at the South Chicago Works. E. C. Potter.
 Progress of Metallurgical Science in the West. Richard Pearce.
 The Re-opening of the Tilly Foster Iron Mine. F. H. McDowell.
 Proposed Rail Sections. Robert W. Hunt.
 An Improved French Pocket Compass. R. A. Bergier.
 Notes on the Manufacture of Open-Hearth Bridge Steel. N. W. Shea.
 Oil as a Metallurgical Fuel. E. C. Felton.
 Proceedings of the Fifty-fourth Meeting, Colorado, June, 1889.
 End Lines and Side Lines in the U. S. Mining Law. R. W. Raymond.
 The Dry Assay of Tin Ores. H. C. Hofman.

From Aqueduct Commissioners, New York City:

Reports on Researches Concerning the Design and Construction of High Masonry Dams, in View of the Proposed Building of Quaker Bridge Dam.

From Frank M. Ashmead, Pittsburgh, Pa.:

Annual Reports of the Allegheny Valley Railroad for the years 1877-81-82-83-84-85-86-87 and 88.

From Carrol Ph. Bassett, Newark, N. J.:

Report of Carrol Phillips Bassett submitted with General Plan for a System of Sewerage for the City of Reading, with a Discussion of the Sanitary Needs of the City and of Sewage Disposal.

From Onward Bates, Milwaukee, Wisconsin:

Six Plans, as follows:
 Standard Wooden Culverts, C. M. and St. P. Ry.
 Standard Pile and Frame Bents.
 Standard Frame Bent Trestle.
 Standard Pipe Culverts.
 Standard Pile Bent Trestle.
 Standard Cattle Guard.

From Bates & Kimball, Boston, Mass.:

Technology Architectural Review. Vol. I, No. 8; Vol. II, No. 8. 1889.

From James G. Blaine, Secretary of State, Washington, D. C.:

Reports of the United States Commissioners to the Paris Universal Exposition, 1878. Vols. I, II, III, IV, V.

Proceedings of the International Sanitary Conference provided for by Joint Resolution of the Senate and House of Representatives in the early part of 1881.

Papers relating to The Foreign Relations of the United States for the year 1872, Vol. I, Part 2; Vol. II, Part 2; Vol. III, Part 2; Vol. IV, Part 2; Vol. V, Part 2.

International Monetary Conference, held in Compliance with the Invitation extended to certain Governments of Europe by the Government of the United States, in pursuance of the Second Section of the Act of Congress of February 28th, 1878, in Paris, in August, 1878, under the Auspices of the Ministry of Foreign Affairs of the Republic of France.

Reports upon the Survey of the Boundary between the Territory of the United States and the Possessions of Great Britain, from the Lake of the Woods, to the Summit of the Rocky Mountains, authorized by an Act of Congress approved March 19th, 1872, with accompanying Maps.

Report of the Electrical Conference at Philadelphia in September, 1884.

Commercial Relations of the United States with Foreign Countries during the years 1882 and 1883, Vols. I and II.

Report upon the Commercial Relations of the United States with Foreign Countries for the years 1874-76-77-80-81.

From Max J. Becker, Pittsburgh, Pa.:

Report of the Tenth Census of the United States, Vol. VII, 1880.

From Brigadier-General S. V. Béné, Chief of Ordnance, U. S. Army, Washington, D. C.:

Annual Report of the Chief of Ordnance to the Secretary of War for the fiscal year ended June 30th, 1888.

Ordnance Notes No. 48, on Steel Wire Guns. Lieutenant G. Moch.

Ordnance Notes No. 49, on the Rifling of Guns. Lieutenant William Crozier.

Ordinance Notes No. 50, on The Physical Properties of Iron and Steel at Higher Temperatures. James E. Howard.

From G. H. Benzenberg, Milwaukee, Wis.:

Annual Report of the Board of Public Works of the City of Milwaukee, Wisconsin, for the year 1888.

Report of the Commission of Engineers on the Collection and Final Disposal of the Sewage and on the Water Supply of the City of Milwaukee, Wisconsin, 1889.

From Ar. P. Blanchet, New York City: Comparaison entre Nicaragua, Panama and Suez Pour faire suite à la brochure "La Lumière sur Panama." Par Ar. P. Blanchet, Paris, 1887.

Analyse et Critique du Rapport lu par M. Ferdinand de Lesseps à l'Assemblée Générale des Actionnaires de la Compagnie du Canal le 29 Juin, 1882.

Two Photographs "Canal Interocéanique de Nicaragua."

From the Board of Railroad Commissioners of Iowa. W. W. Ainsworth, Secretary, Des Moines, Iowa.

Eleventh Annual Report of the Board of Railroad Commissioners for the year ending June 30th, 1888.

From Boston Public Library, Boston, Mass.:

Thirty-seventh Annual Report of the Trustees of the Public Library of Boston, Massachusetts, for the year 1888.

Supplement to Thirty-seventh Annual Report of the Trustees of the Public Library of Boston, Massachusetts, for the year 1889.

From Brandis Mfg. Co., New York City:

The Aneroid Barometer; its Various Forms; its Theory and its Use, with Special Reference to the Determination of Altitudes. E. A. Gieseler, New York, 1889.

From Harold P. Brown, New York City: Electrical Distribution of Heat, Light and Power. Harold P. Brown, New York City, 1889. With Partial list of Deaths from Electrical Lighting Apparatus, and Address by John Murray Mitchell, Counselor at Law, on Legislative Control of Dangerous Electrical Currents.

From Buffalo Merchants' Exchange, William Thurstone, Secretary, Buffalo, N. Y.:

Annual Report of the Buffalo Merchants' Exchange, including Statistics of the Trade and Commerce of Buffalo, 1889.

From Bureau of Education, Washington, D. C.:

No. 3. The History of Education in North Carolina. Charles Lee Smith.

No. 4. History of Higher Education in South Carolina, with a sketch of the Free School System. Colyer Meriwether.

No. 5. Education in Georgia. Charles Edgeworth Jones.

No. 6. History of Education in Florida. George Gary Besh.

No. 7. Higher Education in Wisconsin. William F. Allen and David E. Spencer.

Proceedings of the Department of Superintendence of the National Educational Association at its meeting in Washington, February 14-16, 1888.

From Bureau of Navigation, Navy Department, Washington, D. C.: Pilot Charts of the North Atlantic Ocean for March to August, 1889, inclusive.

From Bureau of Statistics, Washington, D. C.:

Reports from the Consuls of the United States N. S. January to May, 1889.

Contents and Index to Vol. XXIX of Reports from the Consuls of the United States, Nos. 101 to 104, months January to April, 1889, inclusive

Maps showing the location of the Diplomatic and Consular Offices of the United States of America, March 1st, 1888.

Annual Report of the Chief of the Bureau of Statistics on the Foreign Commerce of the United States for the year ending June 30th, 1888.

Annual Report and Statements of the Chief of the Bureau of Statistics on the Foreign Commerce and Navigation, Immigration and Tonnage of the United States for the fiscal year ending June 30th, 1888.

From California Academy of Sciences, F. Gutzkow, Secretary, San Francisco, Cal.:

Proceedings of the California Academy of Sciences, Vol. I, Part 1, June, 1888; Vol. I, Part 2, April, 1889.

Memoirs of the California Academy of Sciences, Vol. II, No. 2.

From Frank A. Calkins, New York City: Papers on Practical Engineering.

Atlas accompanying Vol. III on Mining Industry.

Annual Report of the Canal Commissioners of the State of New York, transmitted to the Legislature January 5th, 1875.

Engravings of Plans, Profiles and Maps illustrating the Standard Models from which are built the Important Structures of the New York State Canals, accompanying the Annual Report of the State Engineer and Surveyor on the Canals for 1859.

To the Friends of Rapid City Transit: Illustrated description of the Broadway

Pneumatic Underground Railway, with a full description of the Atmospheric Machinery and the Great Tunneling Machine. Le Spectacle de La Nature ou entretiens sur les particularités de L'Histoire Naturelle, Vol. VII, Alahage, 1747.

A new Spanish and English Dictionary. Capt. John Stevens, London, 1706.

Scientific American:

Vol. XIII, September 12th, 1857, to September 4th, 1858.

Vol. XIV, September 11th, 1858, to June 25th, 1859.

Vol. I, July to December, 1859.

Vol. II, January to June, 1860.

Vol. III, July to December, 1860.

From the Canadian Institute, Allan Macdougall, Toronto, Canada:

Proceedings of the Canadian Institute, Third Series, Vol. VI, 1887-88; also Annual Report of the Canadian Institute, Session 1887-88, being part of Appendix L to the Report of the Minister of Education, Ontario, 1888.

From Andrew Carnegie, New York City: Pennsylvania's Industries and Railroad Policy.

- From General Thomas Lincoln Casey, Chief of Engineers, U. S. A., Washington, D. C.:
- Report relative to the construction of certain dams in the Rio Grande.
- Report of a Board of Engineers upon the further improvement of the entrance to Key West Harbor, Florida.
- Report of the results of an examination of historic grounds, locations and military works in the Maumee Valley, with an estimate of the probable cost of their purchase by the United States.
- Report of an examination and survey of the channel of the Mississippi at Rock Island, Ill.
- Report of a Board of Engineers upon the expediency of further improving the harbor of Saint Augustine, Florida.
- Report of the Chief of Engineers and accompanying maps relative to the jurisdiction of waters in Detroit River and the St. Clair Flats.
- Report of a Board of Engineers upon the proposed plan for the improvement of Winyax Bay, South Carolina.
- Report relating to the obstruction of navigation on the inland water route through North Landing River, Currituck Sound.
- Report of the names, residences, compensations and places of employment of civilian engineers engaged in river and harbor work from July 1st, 1887, to June 30th, 1888.
- Official Army Register for January, 1889.
- Quarterly Statement, Corps of Engineers, United States Army, April 10th to July 12th, 1889.
- Advertisements, Specifications and Proposals, as follows:
- For Constructing a Pile Dike between Fisher's Point and Petty's Island.
- For Furnishing one Tow Boat.
- For Furnishing one Snag Boat and one Tow Boat.
- For Furnishing and Placing Stone on Breakwater at Bar Harbor, Maine.
- For Furnishing Drilling Barge, and one Dumping Flat.
- For Stone Jetties, Training Wall and Bank Protection, Saco River, Maine.
- For Furnishing Cast-iron Water Pipes and Castings for Water Supply, District of Columbia.
- For Stone and Brush Training Walls, and Jetties, Kennebec River, Maine.
- For Furnishing one Snag Boat, one Drilling Barge and one Dumping Flat.
- For Timber for La Grange Dam on Illinois River.
- For Improving Cossica Creek, Maryland.
- For Improving Broad Creek from its mouth to Laurel, Delaware.
- For Improving Nansemond River, Virginia.
- For Constructing Breakwater at Ashland, Wisconsin.
- For Constructing Dike and Dredging in Flushing Bay, New York.
- For Constructing Breakwater at Marquette, Michigan.
- For Constructing Training Wall in Brunswick Harbor, Ga.
- For Embankment at David's Island Sea Wall, New York Harbor.
- For Embankment at Governor's Island Sea Wall, New York Harbor.
- For Iron Moorings.
- For Stone.
- For Removing the Wreck of the Barge "Amicus" from Pamunky River, Virginia.
- For Repairs of West Pier at Dunkirk Harbor, N. Y.
- For Depositing Stone on the Jetties at Harbor of Charleston, S. C.
- For Furnishing and Placing Riprap Granite in the North Wall of the Inner Harbor at Block Island, R. I.
- For Ohio River Dams and Dikes.
- For Lock Gate Timber.
- For a Sternwheel Tow Boat.
- For Removing Ledge in Portsmouth Harbor, New Hampshire.
- For Removing Wreck of Schooner "Alma," Md.
- For Furnishing and Placing Stone on the Breakwater at the mouth of Saco River, Maine.
- For Repairs and Renewals at Fort Carroll, Md.
- For Repairs at Fort McHenry, Baltimore, Md.
- For Furnishing and Placing Stone on the Breakwater at Rockland, Me.
- For Dam No. 8, Monongahela River.
- For Improving Maurice River, N. J.
- For Furnishing Stone for Use at the Des Moines Rapids Canal.
- For Improving Susquehanna River, Md.
- For Construction of Breakwater at Mouth of the Housatonic River, Conn.
- For Lock on Muskingum River.
- For Operating and Care of Canals and other Works of Navigation.
- For Hydraulic Cement.
- For Removal of Outer East Breakwater at Oswego, N. Y.
- For Lake Providence Reach.
- For Removal of Wreck of Steamship "Atlas," in Hudson River, near Barclay Street, New York City.
- For Brush.
- For Improvement of Tillamook Bay and Bar, Oregon.
- For Removal of Wreck in Pataposee River.
- For Removal of Wreck in English Creek, New Jersey.
- For Furnishing and Placing Riprap Granite and Chip Stone on Breakwater at Block Island, R. I.
- For Water Supply, District of Columbia.
- For Builting Snagboat.
- For Furnishing Steam Barge at Erie Harbor, Pa.
- For Furnishing Tug, Scows and Dump Scows at Erie Harbor, Pa.
- For Dike at Red Bank Creek, Allegheny River.
- For Removing Overhanging Trees, Logs, Snags and Boulders from Mississippi River, between Aitken and Grand Rapids, Minn.
- For Constructing Dikes and Mattresses for Rappahannock River, Va.
- For Cement for Beattyville Lock, Kentucky River, Kentucky.
- For Construction of Keepers' Dwellings at Locks Nos. 3, 4 and 5, Kentucky River, Kentucky.
- For Excavating a Lock Pit at St. Mary's Falls, Canal, Mich.
- For Depositing Stone on the Jetties at Harbor of Charleston, S. C.
- For Removing Bar at Mouth of Licking River.
- For Improving Harlem River, N. Y.
- For Improving the Channel between Staten Island and New Jersey.

For Improving Harbor at Wilmington, Del.
 For Improvement of Potomac River, D. C.
 For Rock Excavation.
 For Building No. 8 Lock House and Out-buildings, Great Kanawha River Improvement.
 For Machinery for Lock No. 8, Monongahela River.
 For Removal of the wreck *E. L. Pettingill*.
 For Removal of Wrecks in and near Cambridge Harbor, Md.
 For Improving Trinity River, Texas.
 For Improving St. James River, Del.
 For Construction of Iron Pile Bridge over Mill Creek, at Fort Monroe, Va.
 For Repairing Dikes in the Hudson River between New Baltimore and Troy, N. Y.
 For Constructing Dike at Winyaw Bay, S. C.
 For Repairing Dikes at Rondout Harbor, N. Y.
 For Construction of Brush Dike in James River, Va.
 For Building a Pile and Crib Dike at Saugerties Harbor, New York.
 For Removing wreck of Schooner *Annie E. Hayes*
 For Building one Lighter for James River, Va.
 For Constructing Dikes and Mattresses in Mattapan River, Va.
 For Building a Dump Boat for Great Kanawha River Improvement.
 For Dimensioning and Backing Stone.
 For Constructing Dump Scows.
 For Furnishing Timber and Plank and Iron Bolts and Spikes and Boulder Stone for Crib Work at the Harbor of Refuge at Sand Beach, Mich.
 For Superstructure of Pier, Milwaukee Harbor, Wis.
 For Constructing and Repairing Dams and Shore Protections of Brush and Stone between Read's Landing, Minnesota, and Fountain City, Wis.
 For Sea Wall on Governor's Island, New York Harbor.
 For Constructing Dams and Shore Protections of Brush and Stone in vicinity of Keithsburg, Ill.
 For Construction of Dams and Shore Protections of Brush and Stone in vicinity of Fort Madison, Iowa.
 For Constructing Dams and Shore Protections of Brush and Stone between Fairport and Muscatine, Iowa.
 For Construction of Breakwater at Glen Cove, N. Y.
 For Sea Wall at David's Island, New York Harbor.
 For Hire of Dredging Plant for Improving Connecticut River, Conn.
 For Hire of Dredging Plant for Improving Housatonic River, Conn.
 For Hire of Dredging Plant for Improving Harbor at Five Mile River, Conn.
 For Dredging in Sheephead Bay, N. Y.
 For Dredging at Great Sodus Bay, N. Y.
 For Dredging in Black Rock Harbor, Conn.
 For Dredging in Bellamy River, New Hampshire.
 For Dredging in Penobscot River, Maine, between Bangor and Crosby's Narrows.
 For Dredging Pamunky River, Va.
 For Dredging in Penobscot River, Maine, between Bucksport and Winterport.
 For Dredging in Apalachicola Bay, Fla.
 For Dredging between the Jetties at Harbor of Charleston, S. C.

For Dredging in Channel leading to Harbor at Baltimore, Md.
 For Dredging in Harbor at Back Cove, Portland Harbor, Maine.
 For Dredging and Removing Ledge in York Harbor, Maine.
 For Dredging and Constructing Spur Dikes, Rappahannock River, Va.
 For Dredging Chickahominy River, Va.
 For Dredging in Saugerties Harbor, N. Y.
 For Dredging Mouth of Black River, Mich.
 For Dredging in Block Island Harbor, R. I.
 For Dredging at Hyannis, Wareham and New Bedford Harbor, Mass.; Newport Harbor, R. I.; Pawtucket, Providence and Pawcatuck rivers, R. I., and Green Jacket Shore, Providence Harbor, R. I.
 For Dredging in Bayou La Fourche, Fla.
 For Dredging in New Rochelle Harbor, N. Y.
 For Dredging Harbor at Au Sable, Mich.
 For Dredging Harbor at Thunder Bay, Mich.

From Strechert Claus, Berlin, Germany:
 Verhandlungen des Vereins für Eisenbahnkunde in Berlin, 1888.
 Mittheilungen aus der Tageslited alter des Eisenbahnwesens.

From Robert Clarke & Co., Cincinnati, Ohio:
 Economic Value of Electric Light and Power.
 A. R. Foote, Cincinnati, 1889.

From Prof. George H. Cooke, State Geologist, New Brunswick, N. J.:
 Annual Report of the State Geologist for the year 1888.

From Commissioners of the State Reservation at Niagara. Henry E. Gregory, Treasurer and Secretary, New York City:
 Fifth Annual Report of the Commissioners of the State Reservation at Niagara for the year 1888.

From E. L. Corthell, Chicago, Ill.:
 A Bill to regulate certain expenditures in the War Department, and for other purposes.
 Report to accompany Bill H. R. 12,625 on the Expenditures in the War Department.

From J. J. R. Croes, New York City:
 Report of Commissioners on Sources of Water Supply for the City of Syracuse, New York, February 1st, 1889.

From Francisco De Garay, Mexico, Mexico:
 El Valle de Mexico, Francisco de Garay Mexico, 1888.

From H. T. Douglas, Baltimore, Md.:
 Sixty-first and Sixty-second Annual Report of the Baltimore and Ohio Railroad Company for the years ending September 30th, 1887 and 1888.

From George Downe, Sydney, New South Wales, Australia:
 Yearly Report of Sydney, January, 1889.

From Dyckerhoff and Ehöne, Amoneburg, Germany:
 Protokoll der Verhandlungen des Vereins deutscher Cement-Fabrikanten und der Section für Cement des Deutschen Vereins für Fabrikation von Ziegeln, Thonwaaren Kaek und Cement am 22 und 23 Februar 1889.

From Engineering News Publishing Company, New York City:
Russian Publication.

Diagrams showing Growth of Railways, Water Works and Population in the United States and Canada.

The Manual of American Water Works, 1888.
General Specifications for Iron and Steel Highway Bridges and Viaducts, new and revised edition. Theodore Cooper.

Le Genie Civil—
Vol. X, January 29th, 1887, to April 30th, 1887.

Vol. XI, May 7th, 1887, to October 29th, 1887.

Vol. XII, November 5th, 1887, to March 24th, 1888.

The Engineer—

Vol. LXI, January to June, 1886.

Vol. LXIII, January to June, 1887.

Vol. LXIV, July to December, 1887.

Fortieth Annual Report of the F. R. R.
Journal of the Association of Engineering Societies.

Zeitschrift des Oesterreichischen Ingenieur und Architekten Vereins. Heft IV, 1886, and Heft I, 1887.

Les Annales des Travaux Publics, January, March, May and September, 1887.

From Engineers' Society of Western Pennsylvania. S. M. Wickersham, Secretary, Pittsburgh, Pa.:

On International Standards for the Analysis of Iron and Steel. John W. Langley.
Report of the Ninth Annual Meeting, Pittsburgh, January 22d, 1889.

From Thomas Evershed, Division Engineer State Canals, Rochester, N. Y.:

American Railroad Journal:

Vol. I, Part I, January to July, 1832.

Vol. II, Part I, January to July, 1833.

Vol. III, Part I, January to July, 1834.

Vol. IV, Part I, January to July, 1835.

Vol. V, January to December, 1836.

Vol. VI, January to December, 1837.

From Desmond Fitz Gerald, Brookline, Mass.:

Annual Address of the President of the Boston Society of Civil Engineers.

From Sanford Fleming, Ottawa, Canada:

Proceedings and Transactions of the Royal Society of Canada for the years 1882-83-84-85 and 1887. Vol. I, II, III and V.

From John R. Freeman, Boston, Mass.:

An Example of Percolation through Embankments and the Natural Closing of Leaks.

From Prof. E. A. Fuertes, Ithaca, N. Y.:

Bulletin of the Agricultural Experiment Station of Cornell University College of Agriculture:

No. 5, April, 1889.

No. 6, June, 1889.

No. 7, July, 1889.

No. 8, August, 1889.

From General Society of Mechanics and Tradesmen, Stephen M. Wright, Secretary, New York City:

One Hundred and Third Annual Report of the General Society of Mechanics and Tradesmen of the City of New York, for the year 1888.

From Charles Glackmeyer, Montreal Canada:

Reports on the Corporation Accounts of the City of Montreal and Reports of the Chiefs of Departments for the year 1887.

From Charles O. Gleim, Hamburg, Germany:

Three Photographs as follows:

The New Bridge over the North Elbe, view from Elbe Dike.

The Elbe Bridge near Hamburg during erection, 1886.

Putting in the concrete foundation for the river piers of the new Elbe Bridge at Hamburg, with the old Elbe Bridge in the background.

Two volumes of the Proceedings of the Association of German Civil Engineers and Architects' Societies, 1885 to 1886 and 1887 to 1888.

From Lieut.-Colonel Conway Gordon, Director-General of Railways, Simla, India:

Director-General of Railways' Administration Report on the Railways in India for 1888-89. Part I.

From John J. Granville, East Saginaw, Mich.:

Annual Reports of the Board of Public Works of East Saginaw, Mich., for the years 1887-88 and 1889.

From Brigadier-General A. W. Greely, Chief Signal Officer of the Army, Washington, D. C.:

Annual Report of the Chief Signal Officer of the Army for the year 1888.

United States Signal Service Monthly Weather Review for December, 1888, and January to May, 1889, inclusive.

From E. B. Guthrie, Buffalo, N. Y.:

Report of the Board of Civil Engineers on the Question of Grade Crossings of the Steam Roads of the City of Buffalo.

Specifications for the Construction of the New Reservoir for the Buffalo City Water Works, 1889.

An Act to Provide for the Relief of the City of Buffalo and to Change and Regulate the Crossing and Occupation of the Streets, Avenues and Public Grounds in said City by Railroads, Chapter 345.

From Leveson Francis Harcourt, London:

Some Canal, River and other Works in France, Belgium and Germany, with an Abstract of the Discussion upon the Paper. The Principles of Training Rivers Through Tidal Estuaries, as illustrated by Investigations into Methods of Improving the Navigation Channels of the Estuary of the Seine.

From Rudolph Hering, New York City:

Report on Proposed System of Sewerage for St. John's, Newfoundland.

Report on the Extension of the Water Supply and on the Disposal of the Sewerage of the City of Toronto. Rudolph Hering and Samuel M. Grey.

From Wilhelm Hildenhand, New York City:

Abt System of Railway for Steep Inclines. Walton W. Evans.

From Albert B. Hill, New Haven, Conn.:

Annual Report of the Department of the Board of Public Works, City of New Haven, Conn., for the year 1888.

From E. W. Howe, Boston, Mass.:

Fourteenth Annual Report of the Board of Commissioners of the Department of Parks of the City of Boston for the year 1888.

From William A. Ingham, Secretary, Board of Commissioners Geological Survey of Pennsylvania, Philadelphia, Pa.:

Atlas Northern Anthracite Field, Part 3 and Part 4.

Atlas to Reports HH and HHH.
Catalogue of the Geological Museum, Part 3.

From Institution of Civil Engineers, James Forrest, Secretary, London:

Tests of a Westinghouse Engine. Stephen Alley.

On Steamers for Water Navigation and Ice Breaking. Robert Runesberg.

The Tides in the Neighborhood of Portsmouth. Bernard O'Driscoll Townshend.

Stress Diagrams of Solid Structures. Robert Henry Smith.

Alternate Current Machinery. Gisbert Kupp (with an Abstract of the Discussion upon the Paper).

The Broad and the Narrow Gauge Systems Constructed on Indian Railways. Francis John Waring (with an Abstract of the Discussion upon the Paper).

The District Distribution of Steam in the United States. Dr. Charles Edward Emery.

The Speed Trials of British War Vessels. David Sing Capper.

Multipliers and Curves for ascertaining the Discharge of Sewers. Robert Maynard Gloyne.

The Reparation of Betchworth Tunnel Docking on the London, Brighton and South Coast Railway. George Lopes.

The Permanent Way of some Railways in Germany and in Austria-Hungary. William Barton Worthington.

On the Use of Heavier Rails for Safety and Economy in Railway Traffic. Christer Peter Sandberg.

Utilization of the Motive Power of the Rhône at Geneva. Henry Handley Pridham Powles.

The Friction of Locomotive Slide Valves. John Audley Frederick Aspinall (with an Abstract of the Discussion upon the Paper).

The Witham New Outfall Channel and Improvement Works. John Evelyn Williams (with an Abstract of the Discussion upon the Paper).

The failure of the Kali Nadi Aqueduct of the Lower Ganges Canal. Walter Hampden Thewall.

Hurst's Triangular Prismatic Formula for Earthwork compared with the Prismoidal Formula. James William Smith.

The Manufacture of Oil-Gas on the Pintsch System and its Application to the Lighting of Railway Carriages. Gilbert Macintyre Hunter.

On the Influence of Chemical Composition on the Strength of Bessemer Steel Tires. John Oliver Arnold (with an Abstract of the Discussion upon the Paper).

Friction Brake Dynamometers. William Worly Beaumont (with an Abstract of the Discussion upon the Paper).

Surveying, embracing the following papers:

I. Preliminary Survey in New Countries, as exemplified in the Survey of Windward, Hawaii. Theodore Graham Grebbie.

II. Rapid Surveying. Francis David Topham.

III. The Practice of Surveying in the Australian Colonies. Samuel Kingston Vickrey.

Abstract of Papers in Foreign Transactions and Periodicals:

The Montevideo Water Works. William Galwey.

The Trincheras Steep Incline on the Puerto Cabello and Valencia Railway, Venezuela. John Carruthers.

Cost of Working the Hartz Mountain Railway. Robert Wisson.

Further information on the working of the Fell System of Traction on the Rimutaka Incline, New Zealand. Joseph Prince Maxwell.

Abstract of the Discussion and Correspondence upon the Paper.

Abstract of the paper on the Mount Washington Railway, New Hampshire, U. S. A. Otto Gruninger.

The Compound Principle applied to Locomotives. Edgar Worthington (with an Abstract of the Discussion upon the Paper).

Minutes of Proceedings, Vol. XCV, 1888-89, Part 1, and Vol. XCVI, 1888-89, Part 2.

List of Members of the Institution of Civil Engineers, 18th February and 1st April, 1889.

From William Jackson, Boston, Mass.:

Thirteenth Annual Report of the Boston Water Board for the year ending December 31st, 1888.

Contract and Specifications for furnishing Cast-Iron Water Pipes and Special Castings.

Contract and Specifications for building a Bridge on Byron Street, over B. R. B. and L. R. R.

Contract and Specifications for building a Pier Head at Marine Park for the Park Department of the City of Boston, February, 1889.

Contract and Specifications for building the Abutments of Leyden Street Bridge, over B. R. B. and L. R. R., March, 1889.

Contract and Specifications for building an Iron Bridge on Leyden Street, over B. R. B. and L. R. R., April, 1889.

Contract and Specifications for Iron Railing for Harvard Bridge, May, 1889.

Contract and Specifications for Roadway Sheathing for Harvard Bridge, May, 1889.

Contract and Specifications for building a Foot Bridge on Cottage Street, East Boston, for the City of Boston, June 5th, 1889.

Contract and Specifications for building two Bulkheads on Commonwealth Avenue, West of Cross Roads, for the City of Boston, June 24th, 1889.

Contract and Specifications for building a Dam at Lake Cochituate, July, 1889.

Contract and Specifications for building a Bulkhead on L Street, South Boston, for the City of Boston, August, 1889.

From Jacksonville Auxiliary Sanitary Association, Jacksonville, Fla.:

Report of the Jacksonville Auxiliary Sanitary Association. Epidemic of 1888.

From Charles B. Johnson, Rahway N. J.:

Catalogue of Interlocking and Railroad Signal Appliances.

From George A. Just, New York City:
Two framed Photographs, Roadway Parapet
and Lamps, Harlem River Bridge.

From John Kennedy, Montreal, Canada:
Annual Reports of the Harbor Commissioners
of Montreal, Canada, for the year 1888.

From Keystone Bridge Co., Pittsburgh,
Pa.:
Examples of Structures built by Keystone
Bridge Co.

From the Kunstadter Patent Screw
Steering and Propelling Co., New
York City:
The Kunstadter Patent Screw Steering and
Propelling Device.

Report made to the Bureau of Steam En-
gineering, Navy Department, June 23d,
1888, by a Board of United States Naval
Engineers, on the relative Steering efficien-
cies of the Rudder alone and of the Kun-
stadter System of Combined Rudder and
Swiveling Screw, as developed by the ex-
periments made with the United States
Screw Steamer *Nina*, to which the two sys-
tems were applied.

From C. W. Langtree, Secretary for
Mines, Melbourne, Victoria, Australia:
Reports of the Mining Registrars for the
quarter ended 31st December, 1888.

From J. Francis Le Baron, Greytown,
Nicaragua, C. A.:
Memoria del Ministerio de Fomento, corre-
spondiente a los Años de 1885 y 1886. Pre-
sentada Al Congreso Nacional de 1887.

From Capt. Smith S. Leach, Corps of
Engineers, U. S. A., Memphis, Tenn.:
Twenty-three Photographs of Improvement
of the Mississippi River, First and Second
Districts.

From Prof. Charles McMillan, Prince-
ton, N. J.:
Notes on the Theory of Cantilever Bridges,
Charles McMillan.

From Massachusetts Board of Railroad
Commissioners, Boston, Mass.:
Twentieth Annual Report of the Board of
Railroad Commissioners, January, 1889.

From Massachusetts Institute Technol-
ogy, Boston, Mass.:
Technology Quarterly, Vol. II, No. 3, Febru-
ary, 1889.

From Niles Meriwether, Memphis,
Tenn.:
Biennial Report of David P. Hadden, Presi-
dent of the Fire and Police Commissioners
of the Taxing District, Memphis, Shelby
County, Tenn., to the Governor of the
State, January 1, 1889.

From Merchant & Company, Philadel-
phia, Pa.:
Two Phototypes of the Eiffel Tower, Paris
Exposition, 1889.

One Phototype showing exact Heights of the
Structure itself, and relative Heights of
various prominent Edifices in the World.

From Colonel Wm. E. Merrill, Cincin-
nati, Ohio:
Address of Colonel Wm. E. Merrill, President
of the Engineers' Club of Cincinnati, at the
Annual Meeting of the Club, December
5th, 1888.

From George S. Morison, Chicago, Ill.:
Great Indian Peninsular Railway Monthly
Guide, Time and Fare Tables for Decem-
ber, 1887.

The Indian Railway Travelers' Guide for
January, 1888.

Neuman's Indian Bradshaw Guide for Rail-
way Travelers in India, for January, 1888.
Handbook of Information for Passengers and
Shippers by the Steamers of the Peninsu-
lar and Oriental Steam Navigation Com-
pany, Nos 11 and 12.

The Japan Railway and Steamboat Travelers'
Guide, with General Information for Tour-
ists in Japan. Second Edition, 1887.

Handbook of the Services of the British In-
dian Steam Navigation Company (Limited)
and its connections.

Programme of Cook's International Tickets
to Egypt, including the Nile to the Second
Cataract.

The Indian Passenger Guide and Cabin Ga-
zette, Vol. I, No. 6.

East Indian Railway Time Table and Coach-
ing Tariff, containing the Rules and Rates
for conveyance of Passengers, Luggage,
Parcels, Live Stock, Carriages, etc., on the
East Indian Railway and on Foreign Rail-
ways working in connection therewith,
No. 1, for January and March, 1888.

Eastern Bengal State, Northern Bengal State,
Darjeeling-Himalayan and Dacca State
Railway Time and Fare Tables for Trains
and Steamers, etc., for December, 1887.

Bombay, Baroda and Central India Railway,
including Rajputana Malwa Railway,
Quarterly Guide and Coaching Tariff, con-
taining Time and Fare Tables, with Map.
Cook's Continental Time Tables and Tourist
Handbook for November, 1887.

Service des Trains Voyageurs. A partier du
1er November, 1887.

A Report to Charles Francis Adams, Presi-
dent of the Union Pacific Railway Com-
pany, on The New Omaha Bridge. By
George S. Morison, Chief Engineer of the
Omaha Bridge.
Report of the Tenth Census of the United
States, Vol. XVII, XIX, XXI, XXII.

From Stewart Murray, Chief Engineer
of Water Supply, Sydney, New South
Wales, Australia:

Proposed Kerang East Irrigation and Water
Supply Trust. Melbourne, 1889. Copies
for distribution.

Proposed Bacchus Marsh Irrigation and
Water Supply Trust. Melbourne, 1888.
Copies for distribution.

Proposed Rodney Shire Irrigation and Water
Supply Trust. Melbourne, 1887. Copies
for distribution.

Proposed Turrumberry Irrigation and Water
Supply Trust. Melbourne, 1881. Copies
for distribution.

Five Sets of Drawings of Storage and Regu-
lating Weir on the Loddon River near
Laanecoorie. Locality Plan.

Schedules of Quantities, Loddon River Weir
and Dam. Copies for distribution.

Contracts at Schedule Rates, National Works
Victorian Water Supply. Copies for dis-
tribution.

Second Annual General Report by the Secre-
tary for Mines and Water Supply, 1888.
Copies for distribution.

From National Academy of Sciences,
Washington, D. C.:
Memoirs of the National Academy of
Sciences:

Vol. I.
Vol. III, Parts 1 and 2.
Vol. IV, Part 1.

From National Publishing and Print-
ing Company, Milwaukee, Wis.:
Handy Lists of Technical Literature. Part I,
1889; also Key to Part I.

From Professor J. S. Newberry, New
York City:
The Street Pavements of New York.

From John Newell, Chicago, Ill.:
Annual Reports of the Board of Directors of
the Lake Shore and Michigan Southern
Railway Company for the fiscal year end-
ing December 31st, 1886-87-88.

From New York Meteorological Observa-
tory. Dr. Daniel Draper, Director,
Central Park, New York City:
Annual Report of the New York Meteorologi-
cal Observatory for the year ending Decem-
ber 31st, 1888.

Abstracts of Registers from Self-recording
Instruments, January to July, 1889, in-
clusive.

From Charles Neilson, Cincinnati,
Ohio:
Annual Reports of the Cincinnati, Hamilton
and Dayton, Dayton and Michigan, Cin-
cinnati, Richmond and Chicago and Cin-
cinnati, Hamilton and Indianapolis Rail-
road Company for the years ending March
31st, 1887, and 1888.

From Albert F. Noyes, West Newton,
Mass.:
Annual Report of the City Engineer for the
year 1888.

From Richard B. Osborne, Philadel-
phia, Pa.:
Professional Biography of Moncure Robinson.

From Oscar W. Petri, Technical At-
taché of the Imperial German Lega-
tion, Washington, D. C.:
Sammlung Ausgeführter Dampebagger, Bag-
gerprähme und Dampfungsboote. Part 1,
1881; Part 2, 1887.

From R. W. Pope, New York City:
Electric Power, Vol. I. Nos. 3, 4 and 5,
March, April and May.

From Arthur Pou, Talbotton, Ga.:
Annual Report to the Stockholders of the
Wrightsville and Tenville Railroad for the
Fifth Fiscal year ending November 30th,
1888.

From H. V. and H. W. Poor, New York
City:
Poor's Manual of Railroads for the year 1889.

From Captain Charles F. Powell, Sec-
retary Mississippi River Commis-
sion, St. Louis, Mo.:

Annual Reports of the Mississippi River
Commission for the years 1881-82-83-84-85
-88.

Reports of the Mississippi River Commis-
sion, July 1st, 1885, to June 30th, 1887.

Report from the Mississippi River Commis-
sion recommending an immediate appro-
priation of \$50,000 for the general work of
Surveys.

The Preliminary Report of the Mississippi
River Commission.

Reports of the Mississippi River Commission,
being Appendix SS of the Annual Report
of the Chief of Engineers for 1881.

Reports of the Mississippi River Commission,
being Appendix RR of the Annual Report
of the Chief of Engineers for 1882.

From George W. Rafter, Rochester, N. Y.:
Twenty-nine Photographs of Fresh Water
Algae on Micro Organism.

On Volvox Globator as the cause of the Fishy
Taste and Odor of the Hemlock Lake Water
in 1888.

From Railroad Commissioners of the
State of New York, Albany, N. Y.:
Sixth Annual Report of the Board of Railroad
Commissioners of the State of New York
for the fiscal year ending September 30th,
1888, Vols. I and II.

From the Rapid Transit Cable Com-
pany. Heyward H. McAllister, Sec-
retary, New York City:
Cable Traction Systems of the Rapid Transit
Cable Company, New York.

From John H. Rauch, Secretary Illinois
State Board of Health, Springfield,
Ill.

Preliminary Report to the Illinois State
Board of Health on Water Supplies of Illi-
nois, and the Pollution of its Streams, 1889.

From Henry W. Reed, Waycross, Ga.:
Fifth Annual Inspection Savannah, Florida
and Western Railway, Charleston and Sa-
vannah Railway, and Brunswick and
Western Railroad, December, 1888.

Proceedings of the Sixth Annual Convention
of the Roadmasters' Association of America,
held at the Metropolitan Hotel, Washing-
ton, D. C., September 11th, 12th and 13th,
1888.

From Leo Von Rosenberg, New York
City:
Map of the Cerro de Pasco Mining District,
Peru, South America.

From Royal Society of Canada. J. G.
Bourinot, LL.D., Secretary, Ottawa,
Canada:
Proceedings and Transactions of the Royal
Society of Canada for the year 1888, Vol.
VI.

From William H. Sayward, Boston,
Mass.:
Third Annual Convention of the National
Association of Builders of the United States
of America, held at Philadelphia, Pa., Feb-
ruary 12th, 13th and 14th, 1889

From Collingwood Schreiber, Chief
Engineer and General Manager Gov-
ernment Railroads, Ottawa, Canada:
Annual Report of the Minister of Railways
and Canals for the past fiscal year, from
1st July, 1887, to 30th June, 1888, on the
works under his control.

Railway Statistics of Canada and Capital
Traffic and Working Expenditure of the
Railways of the Dominion for the year
1888.

From the Society of Arts, Manufac-
tures and Commerce. H. Truman
Wood, Secretary, London:

Report of Conference on Canals and Inland
Navigation, held on Thursday and Friday,
May 10th and 11th, 1888.

- From Sociedad de Ingenieros Civiles, Ingeniero Don Manuel B. Bahia, Secretario, Buenos Aires, Argentine Republic, S. A.:
- Conferencia Final del curso del Teoria de la Elasticidad dictado en la Facultad de Ciencias Fisico-Matematicas de la Universidad de la Capital por el catedrático Ingeniero. Jorge Duclout, Buenos Aires, 1888.
- From Societè des Ingenieurs Civils. M. Henri Vallot, Secretary, Paris, France: Annuaire de 1889.
- From Hamilton Smith, Jr., London: Report of Hennen Jennings, Esq., Superintendent El Callao Gold Mining Company, Limited, for the year 1888.
- From Stevens Institute, Hoboken, N. J.:
- The Stevens Indicator:
Vol. VI, No. 2, April, 1889.
Vol. VI, No. 3, July, 1889.
- From L. M. E. Stone, Commissioner of Dams and Reservoirs, Providence, R. I.
- Annual Report of the Commissioner of Dams and Reservoirs to his Excellency Royal C. Taft, Governor of Rhode Island, January, 1889.
- From Charles L. Strobel, Chicago, Ill.: Pocket Companion, containing useful information and Tables appertaining to the use of Wrought Iron and Steel as Manufactured by Carnegie, Phipps & Co. (Ltd.), Pittsburgh, Pa., 1889.
- From A. N. Talbot, Champaign, Ill.: Report of the Fourth Annual Meeting of the Illinois Society of Engineers and Surveyors, held at Bloomington, Ill., January 23d to 25th, 1889.
- From W. M. Thomas, Staff Surveyor, Auburn, Sydney, New South Wales, Australia:
- The Journal of the Survey Club, Vol. I, Nos. 1 to 10, 1888-1889.
- From L. L. Tribus, New York City: Catalogue and Circular of the School of Engineering for the year beginning September 28th, 1889, and ending June 13th, 1890. Copies for distribution.
- The University of the City of New York. Catalogue and Announcements, 1888-89. Copies for distribution.
- From the Trustees of the Newberry Library, Chicago, Ill.:
- Proceedings of the Trustees of the Newberry Library for the year ending January 5th, 1889.
- From D. Van Nostrand Co., New York City: Modern Heliographic Processes.
- A Manual of Instruction in the Art of Reproducing Drawings, Engravings, Manuscripts, etc., by the Action of Light. Ernst Lutze, New York, 1888.
- From United States Commission of Fish and Fisheries, Washington, D. C.:
- The Fisheries and Fishery Industries of the United States.
- The Fisheries and Fishery Industries of the United States, Section V. History and Methods of the Fisheries, Vol. I, 1887. George Brown Goode, Washington, D. C., 1887.
- The Fisheries and Fishery Industries of the United States, Section V. History and Methods of the Fisheries, Vol. II, 1888.
- The Fisheries and Fishery Industries of the United States, Section V. George Brown Goode, Washington, 1887. History and Methods. Plates.
- From United States Geological Survey, Washington, D. C.:
- Seventh Annual Report of the United States Geological Survey, 1885-86. J. W. Powell, Washington, 1888.
- Twenty-eight Atlas Sheets.
- Bulletin No. 9. On the Relation of the Yard to the Meter.
- From Prof. J. A. L. Waddell, Kansas City, Mo.:
- Iron Viaducts for Highways.
- From J. E. Watkins, Washington, D. C.:
- Photograph. First Locomotive to help man, Trevithick, 1804. Run on tramway in Wales.
- From Arthur M. Wellington, New York City:
- Annual Reports of the Canadian Pacific Railway for the years 1883-85-86-87-88.
- From Messrs. Welton & Bennett, Waterbury, Conn.:
- Twenty second Report of the Board of Water Commissioners of the City of Waterbury, Connecticut, to the Court of Common Council for the year ending December 31st, 1888.
- From Edmund B. Weston, Providence, R. I.:
- Appendix to the Annual Report of the City Engineer of the City of Providence, R. I., for the year 1888. Tables showing the cross of head due to the friction of water in new cast-iron pipes.
- From S. S. Wheeler, New York City: Harper's Weekly, July 27, 1889, containing article on Electric Lighting in New York.
- From John Wiley & Sons, New York City:
- A General Formula for the Uniform Flow of Water in Rivers and Other Channels. E. Ganguillet and W. R. Kutter, New York, 1889.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XV.—November-December, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

NOVEMBER 6TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley, in the chair; John Bogart, Secretary. Ballots for membership were canvassed and the following candidates declared elected: As Members, Bolton Waller De Courcy, Port Townsend, Wash.; John Quintin Jamieson, Portland, Ore.; William Watkins Kenly, Wilmington, Del.; As Juniors, William Frederick Behrens, Albuquerque, N. M.; Morrison Clark Hamilton, Hartford, Conn.; George Warner Sherwood, Bethlehem, Pa.

A communication from the Institution of Civil Engineers of London, with an illuminated address of welcome to the representatives of the American Societies of Civil, Mining, Mechanical and Electrical Engineers who were received in England in June last, was presented, and President M. J. Becker and Messrs. Charles E. Emery and T. C. Clarke were appointed by the chair a committee to prepare a suitable form of acknowledgment.

A communication from the American Institute of Mining Engineers, with reference to a visit to the United States in the autumn of 1890, of the British Iron and Steel Institution, was presented and was referred to the Board of Direction, with power.

A progress report of the committee on the revision of the constitution was presented; the report was accepted and the committee continued. The report is as follows:

To the AMERICAN SOCIETY OF CIVIL ENGINEERS :

The undersigned committee, appointed by the Society at its business meeting during the Annual Convention held at Seabright, N. J., on June 24th, 1889, respectfully submits the following report of progress :

First.—The Committee has held two meetings, at the first of which every member was present. At that meeting a sub-committee was appointed to codify the present Constitution and By-Laws and to suggest a form of amended Constitution. A circular was sent out by the Chairman to the various local Engineering Societies, suggesting the appointment by them of Committees authorized to consult with your Committee upon the subject of affiliation.

Second.—So much delay ensued in consequence of the local Societies holding no meetings during the summer months, that their Committees were not appointed until within a month past, and no opportunity has been had for consultation with them upon the subject.

Third.—Your Committee at its first meeting became convinced that the time at its disposal and the magnitude of the various questions involved, would not permit a final report of an amended Constitution to be made in time for submission of it at the Annual Meeting of January, 1890.

In response to the circular sent out by the Chairman to the members of the Society, asking for such suggestions as members desired to make, a large number of communications were received making such suggestions. Some of them very lengthy, many of them very important and requiring much time for their consideration.

Fourth.—Your Committee, at its meeting held October 17th, 1889, at which all but two of the members were present, decided that in order to facilitate the preparation of an amended Constitution, and to the end that the voting thereon could be intelligently done, there should be adopted a codification of the present Constitution and By-Laws, which is submitted herewith for discussion at the Annual Meeting, and for submission to vote of the Society.

Fifth.—This codification contains only verbal amendments to the present Constitution, in which provisions relating to the same subject are scattered miscellaneously, some of them being in the Constitution and some in the By-Laws.

In this codification no change whatever is made in the sense or meaning of the Constitution and By-Laws. The articles are simply grouped together, all of the present articles relating to one subject being codified as one article, the several portions of which are designated as Sections.

Members will understand that in voting upon this codification, they are not voting upon any amendment of the Constitution and By-Laws excepting only in form, but they are voting for an arrangement of the present Constitution and By-Laws made to enable the work of the Committee to be passed upon intelligently hereafter.

Sixth.—The Committee submits an amendment to the amending clause of the present Constitution, which simply provides that amendments may be considered, discussed and amended at the Business Meeting of the Annual Convention, and voted upon thereafter in the same manner, and in addition to their being considered, discussed and amended at the Annual Meeting and voted upon thereafter as is now provided.

Seventh.—The Committee, in submitting this report of progress, respectfully suggests that it be continued until the Business Meeting of the next Annual Convention, in order that it may have time to fully consider and digest the important suggestions made, and the information obtained bearing upon the subject committed to it.

All of which is respectfully submitted.

WILLIAM P. SHINN,
CHARLES B. BRUSH,
F. COLLINGWOOD,
MENDES COHEN,
O. E. MICHAELIS,
CHARLES L. STROBEL,
S. WHINERY,

Committee.

A codification of the present Constitution and By-Laws, with proposed modification of method of amending the Constitution, was presented, as an amendment to the Constitution, by Messrs. Shinn, Brush, Collingwood, Cohen, Michaelis and Whinery.

The proposed amendment as to method of amending the Constitution is as follows :

SUBSTITUTE THE FOLLOWING FOR ARTICLE IX.

Proposed amendments to this Constitution must be reduced to writing and signed by not less than five Members, and be submitted and acted upon as follows :

1st.—Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting ; if not so amended they shall be voted upon by letter-ballot

as submitted. The vote to be counted at the first regular meeting in March.

2d.—Amendments presented to the Secretary on or before the first Wednesday in April shall be sent by letter to the several Members of the Society at least twenty-five days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and if so amended, shall be voted upon by a letter-ballot in form as amended by said Business Meeting; if not so amended they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in October.

3d.—An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

Mr. Charles E. Emery, M. Am. Soc. C. E., read a paper descriptive of a recent visit to the Forth Bridge.

NOVEMBER 20TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary.

A paper by Edmund B. Weston, M. Am. Soc. C. E., on The Results of Investigations Relative to Formulas for the Flow of Water in Pipes, was read by the Secretary and discussed by Messrs. Fteley, Brush, Hering, Freeman, Emery and Croes.

MEMOIRS OF DECEASED MEMBERS.

ELLIS SYLVESTER CHESBROUGH, Past President Am. Soc. C. E.

DIED AUGUST 18TH, 1886.

Ellis Sylvester Chesbrough was born in Baltimore County, Md., July 6th, 1813. His mother, Pharina Jones, was a Maryland lady, of German and Welsh ancestry. His father, Isaac M. Chesbrough, was a native of North Adams, Mass. The first ancestor of the Chesbroughs landed at Plymouth, Mass., in 1630.

Owing to unsuccessful business ventures on the part of his father young Chesbrough was obliged to leave school when only nine years of age, and from that time until fifteen years of age attended school for only about one year. When fifteen years old he began life as a chainman with a party engaged on a preliminary survey for the Balti-

more and Ohio Railroad. Here his natural ability showed itself in so marked a manner that he was rapidly advanced, being occasionally put in charge of a party during his second year of service.

In 1831 he was appointed Assistant Engineer with Col. S. H. Long, United States Topographical Engineer, on the Allegheny Portage Railroad, then being surveyed. In 1831 he was Assistant Engineer, under Capt. William G. MacNeill, on the Paterson and Hudson River Railroad, and afterward held the same position in the location and construction of the Boston and Providence main line, and on the Taunton and New Bedford branch. In 1836 he was Resident Engineer on a proposed railroad from Lowell, Mass., to Concord, N. H.

On December 23d, 1837, Mr. Chesbrough married Miss Elizabeth A. Freyer, of Baltimore, Md. At this time he was a young Assistant Engineer on the Taunton branch of the Boston and Providence Railroad.

For two or three years previous to 1842 Mr. Chesbrough was engaged first under the direction of Major MacNeill and afterwards as acting Chief Engineer, in the surveys and construction of the Louisville, Cincinnati and Charleston Road, during which time the road was built from Charleston to Columbia. Among the engineers of the party of which Mr. Chesbrough had charge in this work were General George S. Greene, afterward President of the American Society of Civil Engineers; the late Alfred W. Craven and J. P. Kirkwood, Members of the Society, and General John C. Fremont.

The financial panic of 1836-37 had made itself felt, as always, very markedly upon the railroad interests of the country, and in the fall of 1842, Mr. Chesbrough found himself, for the first time since a boy of fifteen, thrown out of employment. During the winter he improved his leisure time by entering the workshops of the Stonington Railroad Company, familiarizing himself with the practical use of tools. The following year he bought a farm, adjoining that of his father, in Niagara County, N. Y., but after a brief experience at farming he gladly returned to his profession. From 1844 to 1846 he was engaged in the construction of the Stoughton and the Pawtucket branches of the Boston and Providence Railroad and of the Ashburnham and Brattleboro line.

Up to this time Mr. Chesbrough's work had been entirely in the line of railroad engineering, but in 1846 he was tendered the position of Chief Engineer of the Western Division of the Boston Water Works. Mr. Chesbrough was at this time thirty-three years of age and entirely unacquainted with hydraulic engineering and was extremely loath to undertake the duties of this position, but yielded to the urgency of his friends, the Water Commissioners, and with the assurance that he would have the benefit of the advice of the late Mr. John B. Jervis, M. Am. Soc. C. E., as Consulting Engineer, he accepted the proffered position. The works thus coming under Mr. Chesbrough's supervision were the Cochituate Aqueduct and the Brookline Reservoir. The plans for these

works had been already matured by Mr. Jervis, and the work was completed in 1849. In 1850 Mr. Chesbrough was made sole commissioner of the works, and in 1851, on the formation of the Cochituate Water Board, was appointed the first City Engineer of Boston, which position he held until 1855, when he resigned to accept the engineership of the Chicago Sewerage Commission.

In December of 1855, Mr. Chesbrough presented a plan for the sewerage of the city, which was finally, after considerable opposition, adopted and carried out, work being begun in 1856. In the latter part of the year Mr. Chesbrough was sent by the Board to examine into the systems of sewerage adopted by the cities of Great Britain and the continent of Europe, which he did with great care and painstaking, the result of his investigations being given in a report published in March, 1858. The importance of this report and the influence it exerted, not only upon Chicago, but on many other cities of the country, can hardly be estimated. At the time the report was written there was not a town or city in the United States that had been sewered in any manner worthy of being called a system. This being, perhaps, the first really exhaustive study which the subject had received on this side of the water, and Chicago being the first city to adopt a systematic sewerage system, the Chicago system soon became famous and Mr. Chesbrough, for twenty-five years, was the recognized head of sanitary engineering in this country.

In 1879 Mr. Chesbrough was appointed Commissioner of Public Works, which position he resigned, together with that of City Engineer, at the beginning of the term of Mayor Carter Harrison.

In 1863, the plan was adopted of a tunnel extending two miles under Lake Michigan to convey pure water to the City of Chicago. This plan had been recommended by Mr. Chesbrough after most careful study. It met with great opposition, and only the characteristic firmness of conviction and modest persistence of Mr. Chesbrough secured its adoption. Its success was immediate, and it has since been supplemented by another similar tunnel. Under his direction were also built two street tunnels under the Chicago River.

In addition to his other labors during his busy life, Mr. Chesbrough was connected as an advisory engineer with very many projects, among them the tunneling of the Detroit River, the planning of the Fullerton Avenue Conduit in Chicago, the Sewerage System of New Haven, Conn., the Water Works of Pittsburgh, the Sewerage of Indianapolis, the Milwaukee Sewerage and Water Works, and the Jacksonville, Fla., and the Akron, O., Water Works. He was also Consulting Engineer on the water works question for the Cities of New York, Boston, Cambridge, Mass., Toronto, Detroit and Memphis; and upon sewerage questions for Boston, Memphis, Peoria, Providence, Des Moines, Dabique, Burlington, Ia., and Chattanooga, Tenn.

In 1880, when the question of increased water supply for the City of

New York came up, Mr. Chesbrough was appointed Consulting Engineer for the Department, and, in connection with the then Chief Engineer of the Aqueduct, Mr. Isaac Newton, prepared the plans for the proposed Quaker Bridge Dam and the new Croton Aqueduct, which works have since been carried out mainly in conformity with the plans then agreed upon. In 1882, Mr. Chesbrough was sent by the City of New York to examine some high masonry dams in France and Spain, and it was during this trip that he was overtaken by the illness which finally resulted in his death. He rallied sufficiently from this attack to return to this country and report the result of his examinations to the Department of Public Works in New York, before returning to his home in Chicago; but the Croton Aqueduct work terminated his professional career. From this time until his death in August, 1886, he was a confirmed invalid.

Mr. Chesbrough became a Member of the American Society of Civil Engineers in June, 1868, and was President of the Society from November, 1877, to November, 1878; he had previously been one of the Directors of the Society during the year 1869. A paper entitled "Sketch of the Plans and Progress of the Detroit River Tunnel" was read before the Society by Mr. Chesbrough at the Convention of 1872, and another paper, "The Detroit River Tunnel," was presented by him at the Convention of 1873.

To eminent ability and wide engineering experience, Mr. Chesbrough added that broad common sense essential to the successful engineer.

Slow in forming an opinion and always endeavoring to ascertain all the practical as well as theoretical information which might possibly aid in a correct conclusion, he was, while eminently courteous and mild in manner, practically immovable from an engineering position which he had finally taken. His persistence in this respect led to the adoption and successful execution of some of his most important works, among them, notably, the tunnels under Lake Michigan.

To the quality of far-sightedness, which he possessed in an eminent degree, is due the success of the public works of the City of Chicago, begun under his supervision, even though the evils from which that city now suffers and which were foreseen, and remedies for which were suggested by Mr. Chesbrough, have proved greater than his anticipations. His standard of professional honor was extremely high. It was his fairness and impartiality, together with a cautious and discriminating judgment that rendered his opinion valuable, and caused it to be sought for on so many occasions. His personal character was above aspersion. "The highest Christian ideal, of doing justly, loving mercy and walking humbly, was the rule of his life."

CHARLES EDWARD FOWLER, M. Am. Soc. C. E.*

DIED JANUARY 28TH, 1883.

Mr. Fowler, for fourteen years City Engineer of New Haven, Conn., was born in Woodbridge, Conn., February 6th, 1841.

His youth was spent in New Haven, Conn., where he received a good high school education and studied surveying under General Palmer.

Early in the war of the rebellion he enlisted in Company G, 20th Conn. Vols., was appointed sergeant, and served in several hard-fought engagements.

His superior abilities as an engineer and draughtsman were recognized by his colonel, and he was detailed for duty at headquarters of the Army of the Cumberland. He was stationed on Lookout Mountain for about a year, engaged in the preparation of plans for hospitals and various engineering work. In 1867 he was engaged as Assistant Engineer on the New Haven and Derby Railroad, then being built. Before the completion of the road he was appointed Chief Engineer, which position he held until his death.

Mr. Fowler was the first City Surveyor of New Haven, being elected in 1869 by the Board of Road Commissioners, without any solicitation on his part.

As the city prospered and grew, the Board of Road Commissioners developed into the Board of Public Works and the City Surveyor into the City Engineer. Mr. Fowler was the unanimous choice of the Board at every election, so admirably did he discharge his official duties.

In addition to his responsible and varied work as City Engineer of New Haven, he prepared plans and estimates for complete systems of sewerage for Northampton, Mass., and Danbury, Conn., and was frequently called in for consultation on important engineering works in other places.

He was an engineer of excellent judgment and very rapid and accurate in his work. As a public officer he was a model of courtesy and tact.

He was always ready to encourage and help his assistants, and was not only respected but loved by them.

Mr. Fowler became a member of the American Society of Civil Engineers, May 3d, 1876.

Mr. Fowler died at his residence in New Haven, of erysipelas, after a short illness, deeply mourned by his widow and two children, a son and a daughter, who survive him.

* Committee to prepare Memoir, Mr. A. B. Hill, M. Am. Soc. C. E.

FRANCIS ULRIC FARQUHAR, M. Am. Soc. C. E.*

DIED JULY 3d, 1883.

Major Francis U. Farquhar, Corps of Engineers, Brevet Lieutenant Colonel United States Army, died at Detroit, Mich., on July 3d, 1883.

He was born in Pennsylvania, was graduated at the Military Academy at West Point, and promoted to the grade of Brevet Second Lieutenant in the Corps of Engineers, June 24th, 1861.

Ordered immediately into the field, he served as Aid-de-Camp to General Heintzelman in the first battle of Bull Run, and with the Army of the Potomac on the Peninsula. He became Chief Engineer of the Department of North Carolina in January, 1863, and of the Department of Virginia and North Carolina in August, 1863.

From May to August, 1864, he served as Chief Engineer of the Eighteenth Army Corps, particularly in the battle of Cold Harbor and the siege of Petersburg.

After that date he served as Assistant Professor of Engineering at the United States Military Academy, as Assistant Engineer in the defenses of Hampton Roads, Va., on the harbor improvements on Lake Erie, and on the Lake Survey. He was assigned to duty as superintending engineer of harbor improvements on the east shore of Lake Michigan in November, 1868, and afterwards served as chief astronomer of the survey of the 49th parallel of latitude, as superintending engineer of river and harbor improvements on the upper Mississippi (including the protection of St. Anthony's Falls), and at the west end of Lake Superior, as Engineer Secretary of the Light House Board, and as Superintending Engineer of the harbors on Lake Huron and of the river improvements from Lake Erie to Lake Superior.

Major Farquhar became a member of the American Society of Civil Engineers July 10th, 1872, and was an active and valued member of the Society. He contributed a paper on "The Preservation of the Falls of St. Anthony," read at the convention at Minneapolis, June, 1883, and published in the Transactions of the Society for October, 1883.

Major Farquhar's health had been gradually failing for about two years previous to his death, although he bore up determinedly, transacting his business until within three hours of his death. He died at Detroit, Mich., July 3d, 1883.

Of great ability and energy, of courteous manners, of unswerving honesty, his loss in the prime of his life will long be deeply felt by those whose privilege it was to know and be associated with him.

His profession has lost one of its most valuable members.

* Committee to prepare Memoir, Gen. Cyrus B. Comstock, M. Am. Soc. C. E.

ADNA ANDERSON, M. Am. Soc. C. E.*

DIED MAY 15TH, 1889.

General Adna Anderson was born at Ridgway, Orleans Co., N. Y., July 25th, 1827. He began his railway career in 1847, as chainman on the location of the New York and New Haven Railroad. From October, 1847, to November, 1848, he was Assistant Engineer of the Connecticut River Road; from November, 1848, to September, 1849, Assistant Engineer on the Mobile and Ohio Road; from that date to March, 1850, Assistant Engineer on the Ashuelot, N. H., Road. Afterward he was successively Resident Engineer of the Michigan Southern and Northern Indiana Railroad, Locating Engineer of the Mobile and Ohio Road, Chief Engineer of the Tennessee and Alabama Road, Chief Engineer and Superintendent of the Edgefield and Kentucky Road and for a short time Chief Engineer of the Henderson and Nashville Road. When the Edgefield and Kentucky Road failed General Anderson was appointed receiver.

When the war of the rebellion broke out General Anderson offered his services to the Government, and was made Assistant Engineer and Chief of the Construction Corps of the Army of the Potomac in Virginia. In the following year he was made General Superintendent of Government Railroads of the Military Division of the Mississippi. From November, 1864, to July, 1866, he was Chief Superintendent and Engineer of all the military railroads.

From February to May, 1867, he was Chief Engineer of the Illinois and St. Louis Bridge; afterwards General Superintendent of the Kansas Pacific Railroad; then Vice-President and General Manager of the Toledo, Wabash and Western Road. General Anderson was made President of the Lafayette and Bloomington Road in 1873; he was appointed receiver of the Chicago, Danville and Vincennes Road in May, 1875; in February, 1880, he was made Chief Engineer of the Northern Pacific Road.

In the latter part of 1881 General Anderson took a long and fatiguing journey over the proposed line of the Northern Pacific Road, making a personal inspection of the proposed route across the backbone of the continent and through what was then the western wilds.

From the observations made on this long journey from Bismarck to Portland, General Anderson became satisfied that the general route laid

* Committee to prepare memoir: Mr. V. G. Bogue, M. Am. Soc. C. E., Mr. L. L. Buck, M. Am. Soc. C. E., and Mr. W. H. Whiton.

down by the late W. Milnor Roberts, Past President Am. Soc. C. E., as the line of the Northern Pacific, was in the main correct, at least so far as the line between the Missouri River and Columbia River is concerned, and on this line, substantially, he went on and completed the road, witnessing the driving of the last spike September 8th, 1883.

The main line having been completed from St. Paul to Wallula, where junction was formed with the Oregon Railway and Navigation Company's line, thus making a through line to Portland, the company turned its attention to its Cascade Division, intended to connect its line at some point near the mouth of Snake River, with Tacoma on Puget Sound. Surveys for this division had been in progress much of the time since March, 1880, and much had been done even previous to that date, at intervals, in the way of reconnaissance and preliminary work. The company desired to build on the best attainable line, but to find this line, with conditions then existing, was a work of great difficulty, requiring time, labor and expense. General Anderson took great interest in all this work, but did not express any final judgment until the autumn of 1883, after all the information was available, when he reported that the line ought to be built through Stampede Pass, believing it to be the route that could be operated at least expense and that it would best protect the company from the encroachments of rival enterprises, which judgment has been fully confirmed by the events of the past two years.

In October, 1886, General Anderson was elected 2d Vice-President of the Northern Pacific Road, which position, together with that of Chief Engineer of this road, he held up to January, 1888.

General Anderson married, in 1856, Miss Juliet C. Van Wyck, who with their six children, survives him. The eldest daughter, Miss Sallie, married Lieutenant John C. Fremont, Jr., a son of General John C. Fremont, who is a lieutenant in the United States Navy; the oldest son, Philip Van Wyck Anderson, is a Civil Engineer on the Northern Pacific Railroad, and the younger children, John C., Elizabeth Van Wyck and Mary Van Cortlandt, reside with their mother at their home in Sing Sing.

In May, 1889, General Anderson opened an office in New York, at 155 Broadway, where he was engaged in organizing the Gordon Fire Alarm Company and the Steel Car Company. About a year before his death he contracted what is known as mountain fever while on one of his western trips, from which he never entirely recovered.

General Anderson was a quiet and somewhat taciturn man, of absolute integrity and clear headed, impartial judgment. He was a steadfast, kindly friend through evil or good report. His works were managed with honorable motives and without scandal. He served his country during the long war of the rebellion with honor and fidelity. While he must have had many opportunities to become wealthy in legitimate ways, the

fact that he died poor shows that no consideration of self interest was allowed to influence him a hair's breadth in his professional duties or in his loyalty to the enterprise he served.

General Anderson deserves to be remembered among men and engineers as one of the noble ones produced by this country.

EDWARD PHELPS ALLIS, F. Am. Soc. C. E.

DIED APRIL 1ST, 1889.

Edward Phelps Allis was born at Cazenovia, N. Y., May 12th, 1824. He graduated from Union College, Schenectady, N. Y., in 1845, his education having been with a view to the practice of law. His tastes, however, favoring an active business life, he went west in 1846, locating in Milwaukee, where in connection with William Allen he opened a leather store under the firm name of Allis & Allen. He remained in this business until 1854, building meanwhile some large tanneries at Two Rivers, Wis., of which he was the active managing director. For a short time Mr. Allis was in the banking and real estate business with Mr. John P. McGregor.

In 1860, he with Mr. C. D. Nash and Mr. McGregor, purchased the Reliance Iron Works, but before a year had elapsed, Mr. Allis secured the interests of the other two gentlemen, and from that time until his death was sole proprietor of what came to be under his management one of the largest, if not the largest manufactories of its kind in the world.

From a moderate beginning Mr. Allis had enlarged and extended these works until the buildings covered three city blocks. Besides these he owned and operated the large Bay State Works in Milwaukee, a foundry on South Bay Street, and rented and operated another foundry in the same city, starting with a business of \$32 000 a year, with twenty employes, and a pay-roll of \$13 000. This really phenomenal enterprise broadened under Mr. Allis's management into a business of \$3 000 000 a year with between twelve hundred and fifteen hundred employes, and a pay roll of over \$700 000, whose products are sent to all parts of the world, shipments being made to Japan, Australia, Cuba, South America, the Sandwich Islands, Europe and Mexico.

The Reliance Works were the first in this country to make roller mills for the making of flour by the roller process.

They also stand prominent in the manufacture of steam engines, saw-mill machinery, mining machinery and heavy pumping engines.



Engraving by J. H. Smith

Edw. P. Ellis

U of M

1701

Mr. Allis was not an engineer, not an inventor, not a mechanic, but he had in full measure that rare talent for bringing together the work of the engineer, the inventor, the mechanic, that it might come to full fruition, and the world at large be a gainer thereby. From the day he took charge of the small, struggling, bankrupt pioneer shop, until the day of his death, he was the life, the moving spirit of the immense industrial establishment he had created. For nearly thirty years he gave to the great work of his life all that could be given of tireless industry, unflagging energy, and persevering determination.

Mr. Allis was prominently interested in the association for advancement of Milwaukee, which took so active a part in the arrangements for the entertainment of the Society of Engineers at the Convention of 1888 in Milwaukee.

He became a Fellow of the American Society of Civil Engineers in July, 1883, and always manifested an active interest in its affairs.

Though not a politician, Mr. Allis was an interested member of the Republican party until 1877, when he became an advocate of the Greenback party, and accepted its nomination for Governor of Wisconsin. He made a personal canvass of the State, and by means of his great earnestness, administrative ability and personal magnetism, won for the party a power in State politics, receiving over twenty-six thousand votes, where before the party had polled only a few hundred.

Mr. Allis was a man of much culture, and possessed an appreciation and love for the finer things of life in a prominent degree. A friend who had known him long and well says: "The panegyrist of Edward P. Allis, no matter how eloquently he speaks, can never express the deeper feeling of silent and true appreciation of those with whom he was intimately acquainted. His success in business would have marked him a prominent man in any community. His retiring modesty, his fine culture and broad learning, would have given him high social standing anywhere, but when to these qualities, great in themselves in him, were added the higher principles of benevolence, fraternity and human feeling, which prompted him to conceive and carry out his plans for the benefit of his working men, we see in every phase of his being the true man. His name will live in the future a powerful example for employers to follow, and will do more to harmonize capital and labor in our city than statutes or boards of arbitration."

To which another adds: "Modest yet bold, tender yet strong, mild yet firm, unusually successful, in still greater measure useful, he was above all men I know beloved by the people. The world is better for his having lived."

December, 1889.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

DECEMBER 4TH, 1889.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: Edward Manning Bigelow, Pittsburgh, Pa.; Edward Everett Buchanan, Athens, Pa.; Emerson Warren Grant, Granbury, Texas; Frederick Thomas Hatch, Indianopolis, Ind.; Herbert Cary Keith, Braintree, Mass.; John Anderson Baush Tompkins, Milwaukee, Wis.; William Glyde Wilkins, Pittsburgh, Pa. As Juniors: George Henry Blakeley, Paterson, N. J.; John Blodgett, Albuquerque, N. M.; George Washington Cole, Wagoner, Ind. Ter.; Solomon Jacob Harwi, Mauch Chunk, Pa.; Francis Charles Trowbridge, Hamilton, O.; Henry Vier, New York City.

A communication from Mr. James Forrest, Secretary of the Institution of Civil Engineers of London, in reference to the acceptance of the address from the American Engineers by Her Majesty Queen Victoria, was read.

The appointment of Messrs. R. Hering, C. F. Loweth and F. W. D. Holbrook as the Board of Censors to award the Norman Medal, was announced.

The appointment of Messrs. George Y. Wisner and Alfred Noble, together with the Secretary of the Society as the Committee to award the Rowland Prize, was announced.

DECEMBER 18TH, 1889.—The Society met at 20 o'clock, Charles B. Brush, Director Am. Soc. C. E., in the chair; John Bogart, Secretary.

The Secretary announced the death, on December 7th, 1889, of Civil Engineer Henry S. Craven, U. S. N.

Announcements were made as to the approaching Annual Meeting.

A paper by Franz A. Velschow, C. E., on the "Causes of Trade Winds," was read and discussed by Messrs. Brush, Crowell, Croes and Velschow.

OF THE BOARD OF DIRECTION.

OCTOBER 3D, 1889.—Applications were considered. The report of the Nominating Committee was presented and, on motion, was ordered printed and issued to all members of the Society. The appointment of

the Board of Censors to award the Normal Medal and of the Committee to award the Rowland Prize was considered.

NOVEMBER 7TH, 1889.—Applications were considered. A communication from the American Institute of Mining Engineers with reference to a proposed visit of the British Iron and Steel Institution, referred to the Board of Direction with power, was considered and a committee of inquiry was appointed. A circular letter from the Committee on Finance of the International Exhibition of 1892 was considered. Appropriations made.

DECEMBER 5TH, 1889.—Applications were considered. Arrangements for the Annual Meeting were made.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

	Date of Election.
BUCHANAN, EDWARD EVERETT...Elmira Bridge Co., Elmira, N. Y.....	Dec. 4, 1889
DE COURCY, BOLTON WALLER...Chief Engineer, Port Discovery, Quillayonte and Olympic R. R., Port Townsend, Wash...	Nov. 6, 1889
GERMANN, FRANZ.....38 Ahumada, Santiago, Chili...	April 3, 1889
GIAVER, JOACHIM GODTSKE.....Shiffler Bridge Works, Pitts- burgh, Pa.....	July 3, 1889
JAMIESON, JOHN QUINTIN.....Division Engineer, Oregon Railway and Navigation Co., Portland, Oregon.....	Nov. 6, 1889
PATTERSON, JOHN CURTIS.....Assistant Chief Engineer, Cen- tral New England and West- ern R. R., Poughkeepsie, N. Y.....	Cet. 2, 1889
WILLARD, JAMES EAGER.....733 Fulton st., Louisville, Ky..	May -1, 1889

ASSOCIATE.

LEWIS, FRANK CLIFFORD.....122 Euclid ave., Cleveland, Ohio.....	June 5, 1889
--------------------------------------------------------------------	--------------

JUNIORS.

HAMILTON, MORRISON CLARK .. Assistant Engineer, New York, New Haven and Hartford R. R., New Haven, Conn.....	Nov. 6, 1889
--------------------------------------------------------------------------------------------------------------------	--------------

HARWI, SOLOMON JACOB.....	Chief Engineer's office, Lehigh Valley R. R., Mauch Chunk, Pa.....	Dec. 4, 1889
ROSENBERG, FRIEDRICH.....	Supervisor Division A, New York Division Pennsylvania R. R., Jersey City, N. J.....	Oct. 2, 1889
SHERWOOD, GEORGE WARNER....	Instructor Civil Engineering, Lehigh University, Bethlehem, Pa.....	Nov. 6, 1889

CHANGES AND CORRECTIONS.

MEMBERS.

ALLEN, KENNETH.....	Superintendent Construction, Board of Public Works, Kansas City, Mo.
BOOTH, WILLIAM H.....	28 St. Mary's Road, Willesden Junction, London, N. W., England.
CAIN, WILLIAM.....	University of North Carolina, Chapel Hill, N. C.
COFFIN, WILLIAM B.....	708 College ave., Elmira, N. Y.
CRAVEN, ALFRED.....	Division Engineer, New Croton Aqueduct, P. O. Box 790, Yonkers, N. Y.
ERNST, OSWALD H.....	Col. Corps of Engineers U. S. A., War Department, Washington, D. C.
FANNING, JOHN T.....	Consulting Engineer, St. Paul, Minneapolis and Manitoba Ry., Manitoba Ry. Bldg., St. Paul, Minn.
FOOTE, ARTHUR D.....	Engineer of Irrigation, Snake River Division, U. S. Geological Survey, Boise City, Idaho.
HOUSE, BRUCE F.....	Assistant Engineer, San Antonio and Aransas Pass, Ry., Houston, Texas.
LANDRETH, WILLIAM B.....	White Plains, N. Y.
MCDONALD, HUNTER.....	Superintendent H. F. & C. Div. Nashville, Chattanooga and St. Louis Ry., Fayetteville, Tenn.
MCGRATH, WALLACE.....	National Military Home, Leavenworth, Kans.
MILLER, J. IMBRIE.....	Bryn Mawr, Pa.
MINTURN, ROWLAND R.....	Acting Superintendent, Chicago, Milwaukee and St. Paul Ry., Milwaukee, Wis.
MORRIS, GOUVERNEUR.....	467 West 23d st., New York City.
OCKERSON, JOHN A.....	U. S. Assistant Engineer Mississippi River Commission, 2732 Pine st., St. Louis, Mo.
OPDYKE, STACY B., JR.....	General Superintendent Central New England and Western R. R., Hartford, Conn.
PAINE, ARTHUR B.....	Consulting Engineer, P. P. & B. R. R., Goshen, N. Y.
PARET, MILNOR P.....	U. S. Engineer's office, Savannah, Ga.

PIHL, OLAF R.....	(Care Hoffman and Bates), First National Bank Bldg., Portland, Ore.
PRATT, MASON D.....	Assistant Chief Engineer Johnson Co., Johnstown, Pa.
PRENDERGAST, F. E.....	National City, Cal.
SAVAGE, ALBERT C.....	342 Seventh ave., Brooklyn, N. Y.
SCHMIDT, MAX O. E.....	Civil Engineer and Contractor, 1138 The Rookery, Chicago, Ill.
SMITH, MILLER A.....	Assistant Engineer Department of City Works, Brooklyn, N. Y.
STEPHENS, CLINTON F.....	1502 Washington ave., St. Louis, Mo.
STEWART, JOHN M.....	Assistant Engineer, New Croton Aqueduct, The Dunnellyn, Yonkers, N. Y.
TEMPLE, ROBERT H.....	Chief Engineer Georgia, Carolina and Northern Ry., Greenwood, S. C.
TOMLINSON, ALFRED T.....	The Rosenfeld Construction Co., Opera House Block, Denver, Colo.
WAITE, CHRISTOPHER C.....	President Columbus, Hocking Valley and Toledo Ry., Columbus, Ohio.

JUNIORS.

CARLL, DAVID S.....	17 Security Bldg., Kansas City, Mo.
CLARKE, ST. JOHN.....	Care Bridge Dept., Baltimore and Ohio R. R., Baltimore, Md.
CONNETT, ALBERT N.....	Care Washington and Georgetown Ry., Georgetown, D. C.
TAPPAN, ROGER.....	Russell Cottage, Kearsarge, N. H.
VILLALON, JOSÉ R.....	32 Nassau st., Room 723, New York City.

RESIGNATIONS.

MEMBER.

	Date of Resignation.
WEEKS, HARVEY R.....	Dec. 20, 1889

ASSOCIATES.

ANDREWS, EDWARD R.....	Dec. 12, 1889
MORDECAI, GRATZ.....	Dec. 14, 1889

DEATH.

CRAVEN, HENRY S.....	Elected Member December 3, 1884; died December 7, 1889.
----------------------	---------------------------------------------------------

THE NORMAN MEDAL.

CODE OF RULES FOR ITS AWARD.*

I.—Competition for the Norman Medal of the American Society of Civil Engineers shall be restricted to Members of the Society.

II.—There shall be one gold medal, and only one, struck for each and every fiscal year of the Society, and awarded as hereinafter provided. The dies therefor shall be with the Superintendent of the United States Mint at Philadelphia, in trust exclusively for the above purpose. Such medal shall be of a cost equal to the annual interest received upon \$1 000 of the Consolidated Stock of the City of New York, Certificate No. 179, of the additional new Croton Aqueduct Stock of the City of New York, authorized by an Act of the Legislature of the State of New York, Chap. 230, passed April 15th, 1870, dated November 17th, 1873, now held in trust by the Treasurer of this Society, and so held solely for this purpose, and shall be executed upon his order.

III.—All original papers presented to the Society by Members of any class, during the year for which the medal is awarded, shall be open to the award, provided that such papers shall not have been previously contributed in whole or in part to any other association, nor have appeared in print prior to their publication by the Society, nor have been presented to the Society in any previous year.

IV.—The Board of Censors to award the medal shall consist of three Members of the Society, to be designated by the Board of Direction. The Secretary of the Society shall act as Secretary to the Board of Censors.

V.—The medal shall be awarded to such paper as the said Board shall judge to be worthy of special commendation for its merits as a contribution to engineering science, not merely relatively as compared with others presented during the same year, but as exhibiting the science, talent or industry displayed in the consideration of the subject treated of, and for the good which may be expected to result from the discussion and the inquiry.

VI.—In case no paper presented during the year shall be deemed of sufficient value to receive an award, the amount of the interest of the fund for that year shall be expended by the Board of Direction in the purchase of books, to be offered as a premium for the second best paper in the next year in which more than one paper of sufficient value may be presented.

VII.—The medal year shall terminate on the first day of August, and the award shall be announced at the annual meeting.

VIII.—The Treasurer of this Society shall cause the medal to be prepared and delivered to, or deposited to the order of, the successful competitor, within two months after the annual meeting at which the same shall have been awarded.

THE ROWLAND PRIZE.

CODE OF RULES FOR ITS AWARD.

Not more than one prize shall be awarded each year for papers presented during the year. The year shall terminate on the first day of August, and the award shall be announced at the annual meeting in January.

The prize shall consist of fifty dollars in cash.

The award shall be made by a committee consisting of the Secretary and two Members of the Society, to be appointed by the Board of Direction.

The prize shall be awarded to such paper as the committee deem most worthy of such recognition, the preference being given to papers describing in detail accomplished works of construction, their cost and manner of execution, and the errors in design and execution.